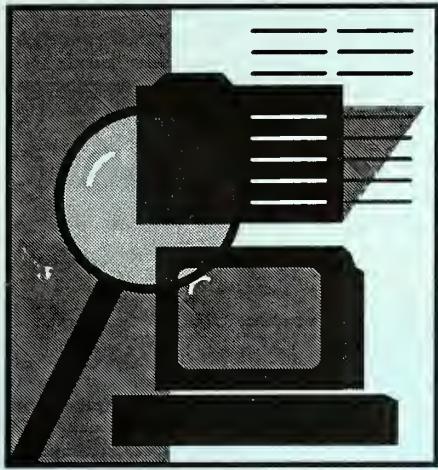


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Automated Patent System

Is It Meeting Examiners' Needs?



A Report of the U.S. Patent and Trademark Office
January 1995





UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

JAN 25 1995

MEMORANDUM FOR

Patent Examiners and Classifiers

FROM:

Assistant Secretary of Commerce and
Commissioner of Patents and Trademarks

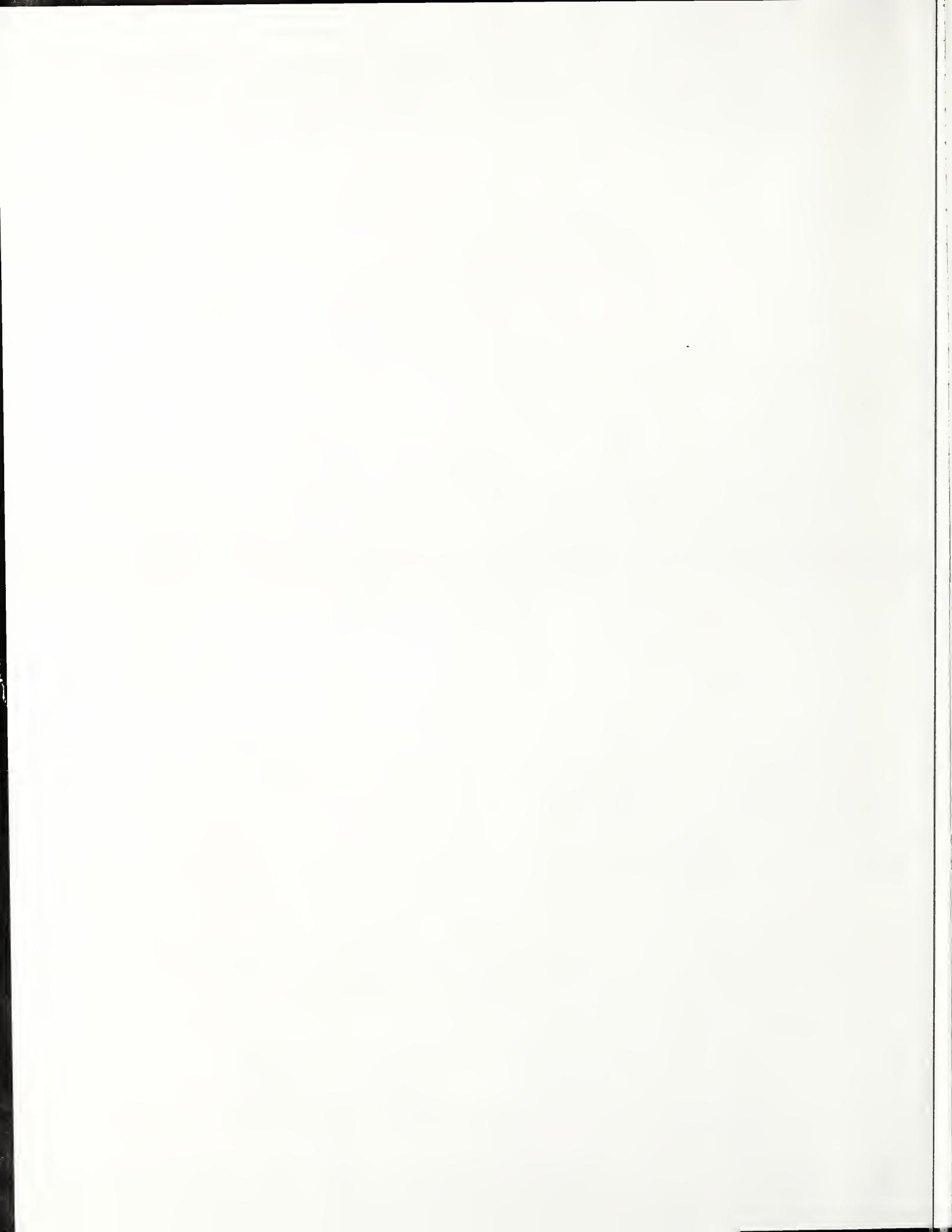
SUBJECT:

Results of the Focus Group/Survey of the Automated
Patent System

I want to thank the 150 employees who participated in the focus group and the over 700 employees who responded to the survey evaluating the Automated Patent System (APS). The involvement was widespread throughout the examining disciplines and showed a strong endorsement for the reliability of APS and supporting networks. Your responses also indicated that some of the areas that we need to improve to better serve the examining corps include: refresher training; operability and maintenance of the printers; and connect times at the image stations. Efforts are already under way to correct these problems and to take advantage of the flexibility of the APS system to meet new expectations and requirements as developing technologies emerge. I will keep you posted on our progress as we work to strengthen APS in the months ahead.

Automated tools enhance the productivity and quality of the work product while providing exciting new methods to perform their assigned tasks. I greatly appreciate the time and efforts that you contributed to help improve the system for everyone, and look forward to continuing this dialog as we prepare the Patent and Trademark Office to meet the challenges of the next century and beyond.

Bruce A. Lehman



PREFACE

Since 1983, our group has had the good fortune to assess the impact of technology in many diverse situations. We have held discussions with consumers reacting to electronic products that are easily available in the marketplace. We have spent hours hearing about the opportunities and challenges surrounding the introduction of advanced telecommunications and automation tools in America's most prestigious and successful corporations.

No matter the setting, we have always relied upon what seems to us to be a rather straightforward, common-sense approach to technology assessment. We have been reluctant to frame our evaluations around what senior managers, systems engineers or vendors might *believe* are the right measurements for success. Instead, we have been inclined to frame our line of inquiry around what the primary users of any technology -- both internal and external users -- say about whether the electronic tools under review are meeting *their* business needs.

Through the years, our methodological strategy has been re-enforced by one basic and over-arching assumption: technology is meant to serve people and not vice versa. To us, this means that evaluation measurements should be crafted around the real-world experiences of those who must actually rely on the technology. These users rarely initiate discussions about capacity, throughput, CPU expansion or architectural configurations. Because real people want to talk about the end results -- the effect of technology on their lives-- we focus on *their* issues first and foremost. Our first objective is to understand *effect* as revealed to us by those who use the technology as part of their daily lives. Only later can we begin to investigate *cause* and establish priorities about things most in need of change in order to better utilize the technology under review.

In conducting this review of the U.S. Patent and Trademark Office's (PTO) Automated Patent System (APS), we worked within the same philosophical paradigm. Senior officials at PTO or PRC (the system developer) were not asked -- and did not attempt -- to establish the criteria around which this evaluation effort would be formed. They did agree that the illuminating force of the study would be the issues raised by the front-line internal users of APS -- the twenty-one hundred patent examiners whose experiences with APS are clearly a telling measurement of the project's success or failure.

Toward that end, our report has taken into account the views of nearly 900 examiners -- almost half of the entire examining community -- gathered through personal interviews and analysis of their survey responses and written comments. Once their concerns came into sharper focus, we reviewed a number of pertinent PTO documents about the performance of certain aspects of the APS as a basis for validating or raising questions about some of the conclusions drawn by the examiners. These data are reported, where appropriate, in this report.

This is our report of how well the APS system is meeting the business needs of its primary users -- the examining corps. This is their story and it has been our welcomed challenge to report it with as much clarity as our resources and time allow.

Patricia Mathis
Mathis & Associates
January, 1995

ACKNOWLEDGEMENTS

The Mathis & Associates team was supported by a number of information technology experts, PRC executives and managers, and U.S. Patent and Trademark Office (PTO) senior officials and managers in the development and implementation of this study.

The Mathis & Associates team which supported this study included Vice President Dan Wojcik, who brought to the study his extensive experience in survey design and technology assessment; Research Director Annie Corboy, who served as project manager; and Cathy Zambrano, Director of the Mathis Survey Group, who managed the logistics and statistical reporting surrounding the actual fielding of the survey. Ken Megill, Chairman of the School of Library and Information Science at the Catholic University of America, provided early support to the team in raising issues that needed to be addressed in the study.

PRC executives and managers who provided information and background data when requested included Denis Brown, Vice President and APS Executive Director, Systems Integration Division; Fred Kory, Chief Scientist, Systems Integration Division; Roxanne Nolan, Principal Computer Analyst; Jeanette Hohlstein, Director, Training and User Support, Automated Management Systems; and Debra Vanderhoof, Procurement Manager, Complex Systems Integration.

Numerous officials and managers from PTO handled logistical arrangements at various stages of this project, provided historical documents for our review and answered questions raised by the Mathis & Associates team. They included Bradford R. Huther, Associate Commissioner; Theresa Brelsford, Assistant Commissioner for Public Services and Administration; Fred DiFiore, Director of Services Program Control, Center for Quality Services; Greg Mullen, Program Analyst, Center for Quality Services; Jim Lynch, Comptroller; Tom Kenton, Director, Office of Computer Operations, Information Systems; Don Kelly, Director, Group 3400; Rich Stouffer, Manager Evaluation Division, Search and Information Resources Administration; Dennis Shaw, Director, Office of System Development and Acquisition; Cynthia Hamilton, User Representative, Evaluation Division, Search and Information Resources Administration; Judy Swann, User Representative, Evaluation Division, Search and Information Resources Administration; Todd Swann, Primary Examiner, Group 2200. Also, members of PTO's "Future's Group" met with the Mathis team on two occasions to share the benefit of their thinking.

Most of all, this report was made possible through the support and cooperation of those examiners who participated in the interviews and completed the survey -- giving us their best thinking about how APS is working and how it can be improved.

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Chapter 1: INTRODUCTION

The U.S. Patent and Trademark Office (PTO) is one of the leading agencies engaged in managing our nation's intellectual resources. Responsible for examining patent applications and issuing patents, PTO received 186,123 patent applications in 1994 -- a number that is expected to grow at an annual rate of 4 percent. Over one million documents are added to PTO's patent files each year. Managing these documents and processing the ever growing stream of patent applications has become one of PTO's greatest challenges.

As a result of a legislative mandate¹, PTO initiated an automation program in 1983. The Automated Patent System (APS) -- designed to improve internal PTO processes, improve patent quality and to facilitate public access to patent information -- is comprised of five major automated information systems²:

- **Text Search** - *This system allows examiners and public customers to search the full text of over 1.8 million U.S. patents issued since 1971 and the English translations of some 3.0 million Japanese Patent Office abstracts. (This research tool has been introduced to the examining corps in incremental phases beginning in 1986. An enhancement project to replace the current text search facility -- including hardware and software -- is scheduled for deployment in the period FY1995-FY2000.)*
- **Classified Search-Image Retrieval (CSIR)** - *This system provides image searching of over 5.8 million patents³ on dual screen workstations to four of the sixteen examining groups or approximately 23% of the examining corps. (It was introduced in incremental phases beginning in 1988. Desktop deployment to all examiners is scheduled to begin in FY1996 and be completed by FY1999.)*

¹In 1980, Congress enacted Public Law 96-517 which required PTO to develop a plan for the automation of all PTO operations.

²PTO is in the process of enhancing, modifying or replacing many of the subsystems within each of these larger systems. Please see the schedule of PTO enhancement, replacement and modification activities for FY1995-FY2000 in Appendix B for further details.

³PTO currently adds some 2,000 patents to CSIR each week.

- **Classification Data Systems (CDS)** - *This system makes it possible to maintain classification data for all patent and application documents⁴ within a unified database. (This system was first introduced in 1982 and updated in 1993. An incremental enhancement project to improve hardware and software is scheduled for deployment over the period FY1995-FY1999.)*
- **Global Patents** - *This system will ultimately make domestic and international patent information available to the examiner on the desktop. (Expected deployment: FY1995-FY2000.)*
- **Patent Application Management (PAM)** - *When implemented⁵, this system will fully automate the patent application process, including the filing of a patent application and managing the application through PTO. This system will eventually replace the current Patent Application Location and Monitoring System (PALM). (Expected deployment: FY1994-FY2000.)*

These systems are the primary automated tools used by PTO in the patent process.

⁴PTO reclassified almost 400,000 U.S. patents in 1993. Reclassification is the process of continually revising the U.S. Patent Classification System to maintain its usefulness as a relevant search system. The U.S. Patent Classification System is an extensive schedule of patents broken down by type of technology into classes and subclasses. The reclassification process involves the restructuring or creation of classes and subclasses of patents to reflect: 1) the evolution of the art, or technology, involved; 2) the emergence of new art; or, 3) the need to subdivide subclasses that have become too large for efficient search by examiners or other users.

⁵In response to an agreement between the PTO and the Japanese Government to immediately develop and deploy a system to provide electronic access to patent applications eighteen months after they have been on file, PTO launched the Pre-Grant Publication (PGPub) system project and put development of PAM on hold. In FY1996, PTO will reassess the PAM project based on an evaluation of the PGPub system. PAM will be developed under the Systems Maintenance and Development (SDM) contract, which will be awarded in 1996. The SDM vendor will eventually replace all PTO automated systems vendors and be responsible for the development and maintenance of all such systems.

Patent application process

At the end of FY1994, PTO had received 186,123 patent applications -- a number which is projected to grow at an annual rate of four percent. The PTO has set as its goal the examination of these patent applications within eighteen months⁶ ("patent pendency"). Once an application is received in PTO's mail room, it is given a serial number and an eight-digit application number. Fees submitted with the application are sent directly to PTO's Finance office.

Following the serialization process, an application is sent through the pre-examination process where it is classified, security screened and reviewed for completion. PTO employs approximately 12 pre-examination classifiers who analyze the subject matter of a patent application, decide if it is a chemical, electrical, mechanical or design patent, and issue a primary (class) and a secondary (sub-class) classification. These classifications are primarily based on the U.S. Patent Classification System.

Pre-examiners screen the application for security and government property rights and for all other required parts. At this point, the application is entered into PTO's current application tracking program, the Patent Application Location and Monitoring (PALM) system. The PALM automated system generates notices which are sent to the applicant throughout the patent process, such as the file receipt that is sent out once the application is reviewed for completion. The file receipt informs the applicant of their application number, the official filing date, the application's primary and secondary classification numbers, and calls the applicant's attention to any parts of the application that may be missing.

In the final step of the pre-examination process, the application is microfilmed and the file is assigned to an examining group, art unit⁷, and an individual examiner who will ultimately make the final patentability determination. PTO's patent examining corps is broken down into sixteen examining groups, each of which is described by a four digit number. Examining groups are managed by a director and organized by discipline. Chemical group numbers begin with #1, electrical with #2, and mechanical with #3, as illustrated in the table that follows on the next page:

⁶See the PTO's Business Reengineering Team's *Patent As-Is Model: Reader Kit* for a thorough tracking of the patent application process.

⁷An art unit refers to the sub-group of a larger examining group and will be described in greater detail later in this section.

Chemical Examining Groups

- 1100 General, Metallurgical, Inorganic, Petroleum and Electrical Chemistry and Engineering
- 1200 Organic Chemistry Drug, Bio-Affecting and Body Treating Composition
- 1300 Specialized Chemical Industries and Chemical Engineering
- 1500 High Polymer Chemistry, Plastics, Coating, Photography, Stock Materials and Compositions
- 1800 Biotechnology

Electrical Examining Groups

- 2100 Industrial Electronics, Physics and Related Elements
- 2200/2900 Utility/Design⁸
- 2300 Information Processing, Storage and Retrieval
- 2400 Packages, Cleaning, Textiles and Geometrical Instruments
- 2500 Electronic and Optical Systems and Devices
- 2600 Communications, Measuring, Testing and Lamp/Discharge

Mechanical Examining Groups

- 3100 Handling and Transporting Media
- 3200 Material Shipping, Article Manufacturing, Tool
- 3300 Surgery, Animal Husbandry, Medical Technology, Amusement and Exercise Devices and Printing
- 3400 Solar, Heat, Power and Fluid Engineering Devices
- 3500 General Construction, Petroleum and Mining Engineering

⁸Group 2200 and Group 2900 are both under the management of one director. Group 2200 is comprised of utility patent examiners in the mechanical, electrical and chemical arts. All Group 2200 examiners are required to have a special security clearance because of the nature of the patents they examine. Group 2900, the Designs patent group, has distinct responsibilities. Because design examiners only look at design and never consider utility, they use APS rarely.

Each examining group is broken down into four to sixteen smaller subgroups, called art units. Art units are also represented by a four-digit number. For example, art unit 1302 (*Food or edible material, processes, compositions and products*) is one of the eight subgroups which make up Group 1300 (*Specialized chemical industries and chemical engineering*). A Supervisory Patent Examiner (SPE) is assigned to head each art unit. There are currently a total of 150 SPEs.

The patent application examination process begins when a patent examiner receives an application to determine patentability. Examiners must rely upon a vast body of technical literature to make this decision, including:

- Internal sources, such as the patent search files as accessed through APS Text Search and Image Search, and PTO's manual, paper-based search system; and,
- External sources, such as commercial, technical computer databases and locally and remotely located technical libraries.

This body of internal and external technical literature includes U.S. and foreign patents, as well as non-patent literature, such as journal articles. The latter has become an increasingly important research tool in the examination process, particularly for examiners in art areas that are rapidly growing, such as computer systems and biotechnology.

Examiners search the technical literature for relevant prior patents or related art in order to determine whether or not a patent can be issued. The ease with which an examiner can locate relevant prior art is influenced by the various classification schemes presently used to organize U.S. and foreign patents and non-patent literature. These include the U.S. patent classification system; key word classification schemes for computer arts; specialized databases containing the full text of more than one million U.S. patents; an electronic database of biotechnology information organized by RNA/DNA features; the Library of Congress indexing system used in PTO's Scientific and Technical Library (STIC); and, the numeric files of foreign patent and other prior art.⁹

Hard-copy and on-line sources are also provided to examiners to facilitate their identification of appropriate art areas to search. These include the Index to the U.S. Patent Classification System, the Manual of Classification, and the Manual of Classification Definitions.

⁹See the Business Reengineering Team's *Patents As-Is Activity Model: Reader Kit*, section A0.

Depending on their seniority and their art unit, each examiner is given a specified number of hours within which they must review and close an application. In general, examiners spend approximately one-third of the time they have been allocated for each application in identifying what art they should research. They spend another one-third actually researching and the remaining third writing up their decision on the application.¹⁰ The following section, "How Examiners Use Automated Tools in the Search Process," describes the paper-based and automated tools used to search the available technical literature during the examination process.

Once a patentability decision has been made on an application, the examiner is responsible for drafting a series of administrative office actions which include their decision on the application's patentability and documentation of the references reviewed in the search process.

During the post-examination process, applicants are informed of the decision made by PTO on their application. Patent documents are prepared for publication -- in such journals as the *Patent Official Gazette* -- and for dissemination, including entry into the Automated Patent System or the manual, paper-based search system used by examiners. Hard copies of the patents are made available to the public in PTO's Public Search Room, located in their Crystal City, Virginia complex, or at the 78 Patent and Trademark Depository Libraries (PTDLs) located across the country.

Role of automation in the patent process

Following the enactment of Public Law 96-517, which required PTO to fully automate the operations of the agency, an *Automation Master Plan* was submitted by PTO in 1982 and it was subsequently approved by Congress.

¹⁰It should be noted that this time allocation figure is a generalization. The amount of actual time spent on each of these tasks varies from art unit to art unit, from application to application, and from examiner to examiner.

PTO's initial *Automation Master Plan* outlined the agency's overall automation strategy for the period 1982-1990. According to this document:

The objectives of the automation program are designed to support more general objectives established for the PTO itself. These are to increase the quality of the patents and trademarks themselves and to decrease the pendency of patent and trademark applications. Patent pendency is to be reduced to eighteen months. The automation program can help achieve the quality objective by eliminating or minimizing the inconsistencies and errors in the PTO's files, by improving the procedures used to correlate incoming documents with pending applications, and by providing examiners with access to databases that are more complete and current than existing databases.¹¹

Five automated subsystems were outlined in the original plan, including: a subsystem to capture text and image; a subsystem that would process the text and image databases; a subsystem of electronic workstations and services; a subsystem that would provide management information services; and a subsystem of network and process control.¹²

Although the overall objectives outlined in the 1982 *Automation Master Plan* have continued to guide PTO in the development and implementation of its automated systems, the actual system component goals have changed over the course of time. In response to technological changes and agency requirements, the plan was revised several times, the last of which was in 1987. More recently, PTO outlined its automation objectives in a document called the *Strategic Information Technology Plan: FY1995-FY2000*.¹³

¹¹U.S. Patent and Trademark Office. *Automation Master Plan: Developed in Response to Section 9 of P.L. 96-517*. U.S. Department of Commerce, October, 1982, page 1-4.

¹²U.S. Patent and Trademark Office. *Automation Master Plan: Developed in Response to Section 9 of P.L. 96-517*. U.S. Department of Commerce, October, 1982, page 1-6, 1-7.

¹³*Strategic Information Technology Plan: FY1995-FY2000*. U.S. Patent and Trademark Office, October 24, 1994. The major project goals relating to APS and the patent process are outlined in Appendix B.

From the outset, PTO planned to develop its automation program in an evolutionary fashion and to work closely with the private sector in system development and implementation. While the MITRE Corporation played an instrumental role in the development of PTO's initial *Automation Master Plan*, the contract to begin developing APS was ultimately awarded to PRC, Inc. in 1984. APS has been developed and deployed incrementally over the past eleven years by PTO, PRC and other vendors as changes in technology have occurred and as the patent process itself has been re-engineered.

Automation plays a major role in the patent process. In addition to the desktop PCs that are used by managers, administrative staff, examiners and classifiers throughout PTO for a mix of administrative and some text search activities, there are three major automated information systems (AIS) currently in place -- Classification Data Systems, Text Search and Image Search. These three AIS comprise the core parts of the Automated Patent System as outlined over the years in the *Automation Master Plan* and in the more recent *Strategic Information Technology Plan*.

The **Classification Data System** (CDS), first introduced in 1982 and then upgraded in 1993, maintains classification data for all patent and application documents. It supports U.S. patent classification, foreign patent classification, issued patent lists, and patent file maintenance. In 1993 alone, PTO reclassified¹⁴ almost 400,000 patents through CDS.

As mentioned earlier, examiners rely extensively on classification schemes throughout the examination process. They are able to access CDS using Messenger, a software product licensed by the Chemical Abstract Service (CAS), in order to relate patents with class and subclass data. PTO's reclassification projects through the CDS analyze thousands of patents in a class or subclass and order them in a manner that will enable an examiner to most efficiently make patentability decisions. PTO plans to initiate a four-year, incremental improvement program for CDS in 1995.¹⁵

The **Text Search** system, introduced in 1986, allows all patent examiners to search and retrieve -- through shared, single screen "text terminals," image workstations or at their desktop PC -- the text of over 1.8 million U.S. patents granted since 1971, as well as the English language abstracts of some 3.0 million Japanese patents. The Text Search software system, called Messenger, is a licensed product provided by PRC's subcontractor, Chemical Abstract Service.

¹⁴See Footnote 4 for a definition of reclassification.

¹⁵See Appendix B for more details.

The ability to search the full text database was first provided to the Public Search Room, located in PTO's office complex in Crystal City, Virginia, in 1989 and later in 1991, to 14 Patent & Trademark Depository Libraries.¹⁶

The Classified Search and Image Retrieval system (CSIR), or **Image Search**, allows examiners to search, retrieve, display and print the images of 5.8 million U.S. patents¹⁷ dating back to 1790 using double-screen image workstations. Examiners can also search the text of patents dating back to 1971 and access external commercial databases through the CSIR terminals or "image (or cluster) workstations." The CSIR system is comprised of the Image Search database and CSIR software.

Image Search capability is currently only available to four of PTO's sixteen examining groups. Group 2200 (*Utility Group, which includes mechanical, chemical and electrical arts*) was provided with image workstations in 1988; Group 2100 (*Industrial Electronics, Physics and Related Elements Group*) in 1989; and Groups 1200 (*Organic Chemistry Drug, Bio-Affecting and Body Treating Composition Group*) and 2300 (*Information Processing, Storage and Retrieval Group*) in 1993. Groups 2500 (*Electronic and Optical Systems and Devices Group*) and 2600 (*Communications, Measuring, Testing and Lamp/Discharge Group*) are scheduled to have Image Search capability by March 13, 1995.

Although Image Search is currently not available through desktop PCs, PTO is scheduled to begin a four-year desktop deployment project in FY1996. By the end of 1999, all examiners -- and classifiers -- should have image search capability from their desktop. Image Search capability has existed in the Public Search Room since 1993.

Public users can place orders for patent documents by accessing PTO's Patent and Trademark Copy Sales (PTCS), a stand alone order entry and production system that is linked to APS's Image Search system. The order information processed through PTCS is passed to APS, which retrieves the images of the ordered documents from CSIR's high resolution database.

¹⁶Fourteen of the seventy-eight Patent and Trademark Depository Libraries (PTDL) were given free access to APS Text for a three year period, which ended in December, 1994. As of January, 1995, subscriptions to APS Text became available to the entire PTDL community on a fee basis. The PTO expects that PTDLs across the country will be making decisions about subscription to this service over the next year.

¹⁷PTO adds some 2,000 patent images to CSIR each week.

The two not-yet-operational systems, which make up the Automated Patent System as outlined in the *Automation Master Plan* and in the current *Strategic Information Technology Plan: FY1995-FY2000*, are the Patent Application Management System (PAM) and the Global Patents system.

The Patent Application Management system (PAM) will replace paper-based manual procedures for filing a patent application with electronic procedures. It will simplify and expedite patent examiner office actions and provide an enhanced mechanism for tracking applications and patent actions throughout the patent process. PAM will also replace the Patent Application Location and Monitoring system (PALM), the current workflow tracking and status reporting system for patent application processing.

According to the most recent *Strategic Information Technology Plan: FY1995-FY2000*, PTO recently decided to redirect the PAM effort toward the development and implementation of a Pre-Grant Publication (PGPub) system by January 1, 1996. The PGPub system is being developed in response to an agreement of the administration with the Government of Japan¹⁸ requiring PTO to provide electronic access to all patent applications eighteen months after they have been filed. As the PGPub system will constitute the initial implementation of capabilities associated with PAM, PTO will use an evaluation of it in FY1996 to determine whether and how to proceed with the PAM project. Development and deployment of PAM is expected to be completed by FY2000 -- if resources are made available -- under the Systems Development and Maintenance (SDM) contract.¹⁹

¹⁸The PGPub system is being developed in response to an agreement between the PTO and the Japanese Patent Office (JPO). Under the agreement, PTO will: 1) "publish pending patent applications 18 months after they have been filed, beginning with applications filed after January 1, 1996"; and, 2) "expand reexamination proceedings to allow greater participation by third parties". By January 1, 1996, the JPO will "end the practice of allowing third parties to oppose a competitor's patent before it is granted" and "put in place ...an accelerated patent examination procedure that will enable applicants to obtain disposition of their patent applications within 36 months." Under the agreement the JPO will also "end by July, 1995 its practice of awarding dependent patent compulsory licenses." See the cover story of the September, 1994 issue of *PTO Pulse* for more details.

¹⁹PTO is planning to replace the current APS contractor and several other related contractors with a Systems Development and Maintenance (SDM) contractor by the end of FY1996. The SDM contractor will be responsible for the planning, analysis, design, development, enhancement and maintenance of all of PTO's automated information systems and supporting technical infrastructure. An RFP for the SDM contract is expected to go out by the end of 1994.

The development and deployment of the Global Patents system is expected to begin in FY1995 and end in FY2000. The Global Patents project will develop an integrated system that will allow examiners to access European and Japanese patents from their desktop. The project will be implemented in an incremental fashion. Initially, examiners will be able to search and retrieve an English language abstract of the Japanese or European abstract, as well as an image of the main drawing. Later, the full images of the first few pages of the patent will be available at the desktop. Examiners will also have available to them a full array of foreign patent search tools, including technology classifications, indices, thesauri and concordances. PTO also plans to make this system available to the public through the Patent and Trademark Depository Libraries (PTDLs).

Other non-APS automated tools regularly used by examiners in the patent process are the external electronic search databases which contain non-patent literature (NPL) and foreign patent abstracts. While APS does not have an internal, automated NPL search and retrieval capability, it is linked electronically to external, commercial databases. PTO is considering launching an NPL project, which would begin in FY1999²⁰.

How examiners use automated tools in the search process

Patent examiners -- PTO's front-end APS users -- conduct their patent searches using six major channels or sources of information:²¹

Major Channels of Information

- The shoes
- Image (or cluster) workstations
- Text terminals
- Desktop PCs
- Commercial databases
- Walk-up printers

²⁰ See Appendix B for more information.

²¹ Four channels allow access to APS and five channels depend in some measure on automated systems.

The primary, non-automated source is an extensive system of wooden and metal shoebox-sized drawers -- "**the shoes**" -- which contain copies of patents dating back to the time patents were originally granted by the U.S. Government in 1790. The shoes also contain a limited collection of foreign patents, as well as a somewhat random collection of related non-patent literature (NPL), such as journal articles. The shoes, which require manual searching of paper, are located throughout PTO's various offices in Crystal City.

The automated, APS-accessible sources include the CSIR "image (or cluster) workstations," which allow approximately 23% of the examining corps to access both text and image from one workstation; the shared-use, single screen "text terminals," which allow examiners to access APS' Text Search system using Messenger software; desktop PCs, which currently allow some 91% of the examining corps to access Text Search through direct dataline connection via the PTO Network (PTOnet) or through a modem; and the walk-up printers, which allow examiners to print out a copy of text or image after they have completed a search on a cluster workstation, a text terminal, or their desktop PC.

The final automated source, available to examiners in varying degrees, are **commercial databases**, which provide access to non-patent literature and foreign patents. Examining groups, as well as individual examiners within a group, have access to different commercial databases, based upon the types of information they need to search on a regular basis. An examiner must have an account number to access any given commercial database, whether from the cluster workstation, text terminal, desktop PC, or a database located in PTO's Scientific and Technical Information Center (STIC).

The extent to which individual examiners rely on APS as a primary research tool depends on a number of factors: the nature of their art area; individual search techniques; an examiner's experience in researching the shoes; the availability of documentation in the shoes at any given time; and an examiner's computer comfort level and knowledge of APS' features and functions.

Why APS was launched as a project

PTO's *Automation Master Plan* outlined several objectives that would be achieved by the development and deployment of the Automated Patent System. The major objectives were to improve patent quality, minimize patent litigation, simplify and improve document management, and to facilitate information exchange with foreign patent systems.

The primary focus of APS has been on improving patent quality.²² While APS directly supports the patent examiners in conducting more accurate and thorough searches, the principal beneficiaries of improvements in quality are the public and nation as a whole, through a strengthened intellectual property system. Increased productivity and trade result from new, high quality patents, delivered in a timely manner to wider audiences.

Another overarching objective of the automation program is to reduce costly litigation involving patent rights, as well as keep time consuming patent litigation off of crowded Federal court calendars. The complete file integrity which APS was designed to provide, as well as simultaneous access to all patents, permits the patent examiners to conduct their searches in a manner that greatly improves the quality of issued patents. Under the manual system, an estimated 5-7% of the documentation was missing at any given time, due to misfiling or use during the examination process. Examiners also report that as much as 30% of a file can be "missing" at any given time and the overall file integrity tends to vary between examining groups.

Automation also addresses the problem of document management. Documents that once filled the equivalent of two football fields will now fit in one room. This is especially important to the Patent Copy Sales division, where the warehousing of documents was becoming a major issue. Not only is the quality of the patents they are able to produce superior under APS, they can also respond to client requests electronically, providing a faster and more efficient public service.

Conversion of all documents to digital form has made it faster and easier to exchange information with foreign patent systems when that capability is deployed. According to a PTO spokesperson, PTO and the Japanese and European patent offices have already signed protocols and agreed on standards for information exchange. Stimulation of international trade and related business development is an anticipated outcome.

²²While many criterion could be selected as the basis for defining "patent quality," it can be measured by the number of cases that go before the Board of Patent Appeals and Interferences (BOPAI). The ability to review and take into account all previously awarded patents is a bedrock requirement for patent quality. The ever-expanding volume of patents and the requirements for 100% file integrity would make a modern standard for quality virtually impossible without automated tools.

How APS has evolved

When PTO awarded the contract to build the Automated Patent System to PRC in April, 1984 it was one of the largest and most technically challenging automation programs in the federal government. The first production version of the system was built on leading edge technology. In fact, the CRT resolution, dual-screen configuration and performance requirements for the examiner workstation were not available commercially, so the initial workstations had to be specifically developed for the APS. For the other components -- such as the mainframe, file servers, support processors, image storage devices and communications network components -- the latest in available technology was procured. An open systems approach was used so that the system components could expand to meet future requirements and migrate with technological advances.

The first production delivery for the APS was the text search capability for word searching all the U.S. patents from 1975 to current -- about one million patents. This initial capability was provided along with training, first to the examiners in Group 2200 in 1986 and by 1988 to the entire examining corps (over 1,200 examiners at that time). A second text database containing over 600,000 English abstracts of Japanese patents was made available in 1987. Today, that database has over 3.0 million abstracts.

The APS began its first production run with image search and retrieval on December 14, 1987, with fifty patent examiners from Group 2200. As one of PTO's fifteen patent examining groups in existence at that time, Group 2200 was selected for first implementation because of the wide range of patent applications it processes. These examiners could search and display full patent images from 163,000 patent documents loaded to twelve priority image storage devices connected via high speed Xerox Network System (XNS) protocol based communications, the performance leader at that time.

After the initial capabilities were delivered, APS system engineers began work on the requirements to provide the capabilities to the other examining groups, to increase the volume of data available, to expand functional capabilities, and to provide access to the public. To accomplish this expansion, many additional system components and technological upgrades were incorporated into the APS.

In 1988, the text search capability was piloted in the public search room and by 1989 was placed in production for public user access to the PTO text databases. In 1991, an equivalent capability was given to non-local public users by an APS pilot project that provided text terminals, communications, and text search access to fourteen Patent and Trademark Depository Library (PTDL) sites²³ strategically located across the United States.

In 1989, PTO began a major effort to expand the system to provide access to images of all U.S. Patents back to 1790, a total of 5.7 million patent documents and to expand the functionality and size of the U.S. Patent text database. This required the purchase of vast amounts of additional storage, scanning and loading of over 5 million patent image documents, replacement of the existing mainframe and the upgrade of user workstations and network communications.

By the end of 1990, a great deal had been accomplished. The Group 2100 and 2300 examiners were brought on-line with over 400,000 additional patents placed in image storage. Additionally, the U.S. Patent text database was reloaded and expanded to contain patents from 1971 to current, over 1.8 million patents. Now, both the image and text databases grow at the rate of 125,000 patents per year.

In 1992, the backfile load of all 5.7 million U.S. patents was completed for the primary storage on high density optical storage devices (called juke boxes). The requirement to support patent copy sales from this database -- in conjunction with the Patent and Trademark Copy Sales (PTCS) system -- was accommodated in less than a year. This extension to the APS uses high speed printers to extract and print paper copies of approximately 3,000 patent documents (50,000 pages) a day for requesting public users and organizations.

²³See footnote 16 for more information.

In order to meet system communication requirements, PTO embarked on two initiatives to upgrade its communication and networking capabilities. They were the migration of the APS to the Department of Defense Internet Protocol Suite (TCP/IP) and the implementation of PTO-wide network, called PTOnet²⁴. The first TCP/IP components were installed in production in 1992 and the last XNS component removed in 1994. PTOnet is designed to provide universal connectivity from the user desktop to the APS computing facilities as well as to vital office automation services such as electronic mail, printing and file server sharing.²⁵

APS's evolutionary course required that basic equipment be periodically upgraded to meet user requirements. Workstations were re-engineered with better monitors and faster processors at more cost effective prices. In 1993, Group 1200 and the Public Search Room were supplied with re-engineered workstations for image search and retrieval capability. APS system engineers are now performing final tests on a Shared Use Systems (SUS) workstation which costs much less than one third of the original workstation and uses the latest Intel technology. It will also provide the basis for delivering desktop access to all the APS capabilities.

In the spring of 1994, APS completed the load of all patent images (5.8 million) to priority image storage, an on-line rapid access image storage for examiner retrieval and browsing. The new SUS workstation -- when combined with the expanded PTOnet network and the fully loaded image database -- will position PTO for full APS deployment.

²⁴Data regarding PTOnet performance is included in Chapter 5: Performance Indicators and in Appendix D: PTO Exhibits.

²⁵PTO's desktop PCs are connected to PTOnet through file servers, dedicated computers that control all programs and peripherals in the network and allow the PCs to access the network. Through the addition of file servers to the system, more desktop PCs can access the network.

Why this study was commissioned

PTO initiated its automation program eleven years ago. Of the \$1 billion initially dedicated to PTO's automation program, some \$481 million has been spent to date on the development, enhancement and operation of parts of APS. While the system is not yet fully operational, changes in the way search is being conducted by patent examiners and in the state of information systems technology have led PTO to reassess how the remaining resources should be directed over the next seven years. In the coming months PTO's management must review options and make decisions about whether and when the agency should:

- Add foreign patents and non-patent literature to the CSIR database;
- Develop and deploy PAM;
- Integrate PAM and CDS with Text Search and CSIR
- Automate and continue to improve the U.S. Patent Classification System;
- Deploy desktop workstations to all patent examiners, patent classifiers and other users;
- Develop the Examination Toolkit which will include software to enhance and facilitate access to patent literature, non-patent literature, classification data, help systems and office action creation tools;
- Replace the current Text Search system;
- Make global patent information available via desktop PCs and workstations

PTO's approach to developing APS has also come under external review in recent years. In 1988, an Industry Review Panel (IRP) -- comprised of representatives from private industry with experience in developing and implementing large scale automated systems -- was convened by the U.S. Department of Commerce to review the APS program. PTO undertook a number of changes in response to the IRP report and in a follow-on review in 1990, the IRP stated that although "...PTO has made dramatic improvements...several essential improvements need to be made."²⁶

²⁶One 1988 recommendation of the IRP was that PTO manage APS using an evolutionary approach.

Last year, the Government Accounting Office (GAO) was asked by members of Congress to "determine PTO's ability to adequately establish benefit, cost and schedule baselines [for APS], and monitor progress against these baselines."²⁷ In its September, 1993 report, the GAO concludes that "PTO does not have all the necessary processes in place to permit sound management of APS...The inability to effectively measure progress against defined goals and [to] determine causes for deviation [from these goals] forces PTO, Commerce, and Congress to make major investment decisions using uncertain system benefits, uncertain cost and schedule baselines, and uncertain performance against baselines."²⁸

PTO's automation program was also cited more recently in *Computer Chaos: Billions Wasted Buying Federal Computer Systems*, an October, 1994 report by Senator William S. Cohen, the Ranking Member of the Subcommittee on Oversight of Government Management, Senate Governmental Affairs Committee:

Patent information is a strategic resource which has a great bearing on our international competitiveness. Accessing this information quickly and streamlining the application process could have the effect of speeding U.S. products to market. Unfortunately, [the APS project], begun in 1983, is being overtaken by advances in technology. Oversight has been inadequate and the evolutionary management approach being used has left costs and schedules uncertain and Congress with little appreciation of what it is buying at the end of the program.²⁹

Both of these reports recognize the difficulty in measuring performance when using an evolutionary approach to computer acquisition. One of GAO's three major recommendations for PTO is that a process be established to define the expected benefits of its automated information systems, and then to measure actual performance against these expected benefits. This includes identifying expected benefits to both internal and external users for each planned APS investment before any money is actually invested.

²⁷U.S. Government Accounting Office, Report to Congressional Requestors, *Patent and Trademark Office: Key Processes for Managing Automated Patent System Development Are Weak*, September, 1993.

²⁸U.S. Government Accounting Office, Report to Congressional Requestors, *Patent and Trademark Office: Key Processes for Managing Automated Patent System Development Are Weak*, September, 1993.

²⁹Cohen, Senator William S. *Computer Chaos: Billions Wasted Buying Federal Computer Systems*. Subcommittee on Oversight of Government Management, Senate Governmental Affairs Committee, October 12, 1994, page 15.

Such observations were among the reasons for PTO's decision to conduct an in-depth and impartial review of the APS system among those where its impact was felt most -- the front-line patent examiners who daily rely on the technology to perform their job and the public who use the technology during some phase of the application and patent process.

PTO's major external customers -- law firms, inventors, patent researchers, investors, corporations and other citizens -- were surveyed recently in a customer satisfaction survey conducted by the U.S. Census Bureau.³⁰ The Census Bureau mailed the PTO customer satisfaction survey in November, 1994. Data from this survey is expected to be available to PTO's Center for Quality Services in February, 1995, and that organization will issue a report of findings shortly thereafter.

Mathis & Associates, a Washington, D.C.-based technology assessment group, was commissioned to provide measurable data on the levels of internal user expectations and satisfaction with APS. The primary target of this study was therefore the 2,028-member Patent Examining Corps.³¹ The portion of the review addressed in this report is largely limited to Text Search and CSIR, the two components of APS that are regularly used by the examining corps in the process of making patentability decisions on patent applications. Other aspects of APS will be reviewed at a later time.

Methodology

The study was conducted in two phases. During Phase I, Mathis & Associates conducted a series of interviews and focus group sessions and developed a draft survey instrument. During Phase II, the survey instrument was pre-tested, revised and fielded. The results from the survey were analyzed and this report was written during Phase II.

³⁰The PTO external survey is one in a series of customer satisfaction surveys the U.S. Census Bureau is conducting for the U.S. Department of Commerce.

³¹This includes 1,878 patent examiners and 150 supervisory patent examiners.

Conduct of interviews and focus groups

Of primary concern in developing the study was the desire to develop a survey instrument that would determine the extent to which the information needs of the end users -- PTO's examining corps -- are being met by APS. In August, 1994, Mathis & Associates began its research by:

- reviewing the relevant material on APS produced by PTO and PRC, such as the March 31, 1994 "Analysis of Advantages of APS," produced by the Office of Planning, Development and Evaluation of the Search and Information Resources Administration, as well as the September, 1993 GAO report, "Patent and Trademark Office: Key Processes for Managing Automated Systems Are Weak;" and,
- consulting with information resource technology experts.

In addition, interviews were conducted with over 150 people, including PTO managers from the Search and Information Resources Administration (SIRA)³², the Center for Quality Services³³ and the Future's Group³⁴. Participants in these interviews were asked to comment on their impressions of how patent examiners use and view APS. Many of these commentators had previously served in the patent examining corps. Others had been involved in various studies and surveys of APS³⁵, and in planning for future system developments and enhancements.

³²PTO's Search and Information Resources Administration is responsible for overseeing and administering the Office of Search Systems, the Scientific and Technical Information Center (STIC), the Classification Groups and the Office of Classification Support. For the purposes of this study, Mathis & Associates was primarily interested in the views of managers in the Office of Search Systems, particularly the Evaluation division. This division determines user satisfaction with current systems, assesses user needs to aid in automation systems development, and assesses the efficiency and capabilities of automated systems and their effects upon Patents Cost Center operations, work loads and work patterns.

³³PTO's Center for Quality Services provides guidance, coordination and assistance for ensuring quality services to internal and external customers. The center's activities include assistance in understanding customer needs and expectations so that quality services can be defined; establishing service standards; measuring customer satisfaction; benchmarking; and, determining the policy and requirements of necessary training for a quality-driven work force.

³⁴PTO's Future's Group is an advisory body comprised of Patents Cost Center managers. The group advises the Assistant Commissioner for Patents on automation issues and needs.

³⁵Search and Information Resources conducts on-going and ad hoc studies on APS usage, including regular interviews with examiners with access to Image Search.

Immediately following these interviews, Mathis & Associates conducted a series of seventeen focus group sessions with randomly selected patent examiners. Representatives from all sixteen examining groups participated in this process, which was designed to be an impartial forum for learning directly from examiners how APS is used in the examining process. At the beginning of each session, Mathis & Associates explained the nature of the project and stressed that the objective of the focus group meeting was to determine the extent to which APS was meeting their information needs. Participants were asked to frame their discussion around three basic lines of inquiry:

- What about APS is working well?
- What about APS needs to be improved?
- What about APS would you change if you could?

This framework stimulated much lively discussion and information sharing which was captured in a preliminary report of findings.

Development of the survey instrument

Mathis & Associates used the information culled from these interviews and focus group discussions as the basis for drafting a survey instrument. The draft survey instrument, designed to elicit data about individual examiners and examining group specific information needs, was delivered, along with the preliminary report of focus group findings, to PTO's senior management team on September 19, 1994.

Mathis & Associates reviewed the survey instrument with appropriate PTO managers on September 20, and pre-tested it with three groups of randomly selected examiners on September 21-22, 1994. Examiners completed the survey and then participated in a group discussion about the content and style of the instrument. Senior PTO managers and representatives from the employee union³⁶ also provided comments on the survey's design and content.

³⁶Patent Office Professional Association (POPA)

Mathis & Associates revised the survey instrument based on the comments provided to them by PTO's designated commentators. The final survey product contained 60 questions and over 302 data elements, divided into the following sections:

Section I: Overall Information Resources Assessment - Satisfaction with and importance of various aspects of the information resources available to examiners at PTO

Section II: Research Tools Assessment - Level of usage of the various channels used to access APS and satisfaction with and importance of how each of the channels are performing

Section III: Future Needs Assessment - Estimated impact on job performance if certain features or enhancements were introduced in the future

Section IV: Demographics - Demographic information on the professional and personal characteristics of respondents

Section V: Comments - Elaboration on any of the responses to the questions in the survey

Selection and design of the sample

All members of the examining corps, including the 150 Supervisory Patent Examiners, were provided with an opportunity to participate in the study. The Assistant Commissioner for Patents, Lawrence J. Goffney, Jr., sent a letter to all examiners on October 13, 1994 encouraging their active participation in the survey process.³⁷ The process was conducted in two phases: a controlled survey administration and a mail-in survey.

³⁷See Appendix F for a copy of this letter.

Fielding of the survey

With the assistance of PTO, a random sample of 500 examiners -- representing all sixteen examining groups -- was identified to participate in a general survey administration session on October 27, 1994. The random selection was generated by PTO's Center for Quality Services staff using Excel software and a list of 2,028 patent examiners and supervisory patent examiners. Each of the identified 500 examiners received a letter, through their group director, on October 18, 1994 which invited them to participate in the general session. They were asked to respond to the invitation by October 24, 1994. On that same day, the group directors provided the Center for Quality Services with a list of all those who indicated that they would attend the session.

Three hundred forty-four (344) examiners participated in the October 27th session. The general session was held at the Patent Academy during two time periods, 10:00 a.m. and 2:00 p.m. Examiners were given approximately one hour to complete the survey. Surveys were collected by Mathis & Associates and transported directly to their office for data entry.

On Monday, October 24, 1994 the Center for Quality Services mailed the same survey to the homes of those 1,528 remaining examiners who had not been randomly selected to participate in the October 27th general session, ensuring that all examiners received the survey document within the same forty-eight (48) hour period. A letter from PTO Commissioner Bruce Lehman³⁸, which encouraged examiners to complete and return the survey, accompanied the survey. Examiners were provided with a postage-paid envelope addressed to Mathis & Associates. (November 28th was established as the cutoff date and surveys received after that date were not included in the analysis of the results.)

Preparation of the data

A total of three hundred forty-four (344) usable questionnaires were returned from the October 27, 1994 administration. A total of three hundred eighty (380) usable questionnaires were returned from the mail-in process for a response rate of 24.8%. The total overall response rate from both the general session and the mail-in survey was 35.7%.

Responses were key punched, 100% verified and edited by Mathis Survey Group according to Mathis & Associates' specifications. A verification audit of the final data set was performed by an independent third party, Action Data Processing, Inc.

³⁸See Appendix F for a copy of the letter from Commissioner Lehman.

Analysis of the data

The survey design and preliminary analysis of responses provided the basis of analysis of the data. The statistical analysis in this study was restricted to cross-tabulations.

Confidentiality and anonymity of participants

The confidentiality and anonymity of respondents were preserved throughout the conduct of the study. Names of participants in the October 27, 1994 session were randomly selected by computer and subsequently destroyed.

All participants were requested not to put their names on the survey and no identifying numbers were placed on the survey that could be traced to an individual participant.

Scoring of the statistical responses

Respondents were asked to rate their satisfaction with various elements using the following scale:

- 1 = Very satisfied
- 2 = Generally satisfied
- 3 = Neutral
- 4 = Generally dissatisfied
- 5 = Very dissatisfied
- N/A = No answer

Examiners were also asked to indicate how important they believed each element was to their ability to perform their job, using this scale:

- 1 = Critically important
- 2 = Very important
- 3 = Somewhat important
- 4 = Not too important
- 5 = Not at all important

In other sections, respondents were asked to indicate frequency of use or estimate the impact of feature enhancements or changes if they were made to the system.

In reporting statistical scores, responses were grouped into two clusters. Responses in the 1, 2 and 3 categories were aggregated to report an overall "acceptance" score -- reflecting the fact that the remainder of respondents expressed some level of dissatisfaction with a given element. In writing the report, general "acceptability" is also sometimes reported as general satisfaction -- again because the rating excludes all dissatisfied respondents. Responses in the 4 and 5 categories were aggregated to report an overall dissatisfaction score.

Reliability of the data

A total of seven hundred twenty-four (724) completed surveys were returned prior to the November 28, 1994 cut-off date from a total patent examiner population of 2,028. This response level produced a ± 2.9 error rate at the 95% confidence level. Formula applied to derive these calculations are explained in Appendix E: Statistical Analyses Derived from Survey.

Other factors in interpreting the data

In reviewing the statistical data in this report, there are two issues which should be kept in mind. First, when adding the percentages of responses to any given question, it is possible that the total will equal just below or just above 100%. Statistical software packages used to analyze data routinely round off each individual response to the nearest whole number.

Second, when reviewing the cross tabulations of responses against the three broad examining group categories -- chemical, mechanical and electrical -- it is important to note that the percentages of respondents from each of these broad groups only reflects the number of examiners from each group that actually answered that question **and** also indicated to which broad group they felt they belonged. There was a small group of examiners who did not identify themselves as a chemical, electrical or mechanical examiner. Therefore, while their responses were included in the all examiner category, their responses could not be included in the cross tabulations.

Chapter 2: OVERALL ASSESSMENT

Examiners developed their own list of twenty-one information resource management baseline priorities

During the focus group and interview phase, front-line examiners and their managers were asked to indicate what measurements were appropriate for determining how well APS is working within the examining corps. These groups consistently raised a core list of information resource management issues -- such as the adequacy of APS-related training and the effectiveness of the help desk organization. Their ultimate list of twenty-one priorities also included some environmental issues -- like lighting, cleanliness and climate control in the shared work areas -- based on their argument that examiners could not be expected to use APS well when they were physically uncomfortable in the space where the equipment was located. They also produced a list of core items that addressed the bedrock measurements they believed were appropriate for evaluating how well APS was actually working for them.

The list of twenty-one baseline items was transformed into a line of inquiry that constituted the first section of the survey instrument: overall information resources assessment. Results from this section -- which is depicted graphically on the next page -- reveal the rank order of satisfaction levels reported by examiners for each of the twenty-one items. Levels of importance are also indicated below each satisfaction score.

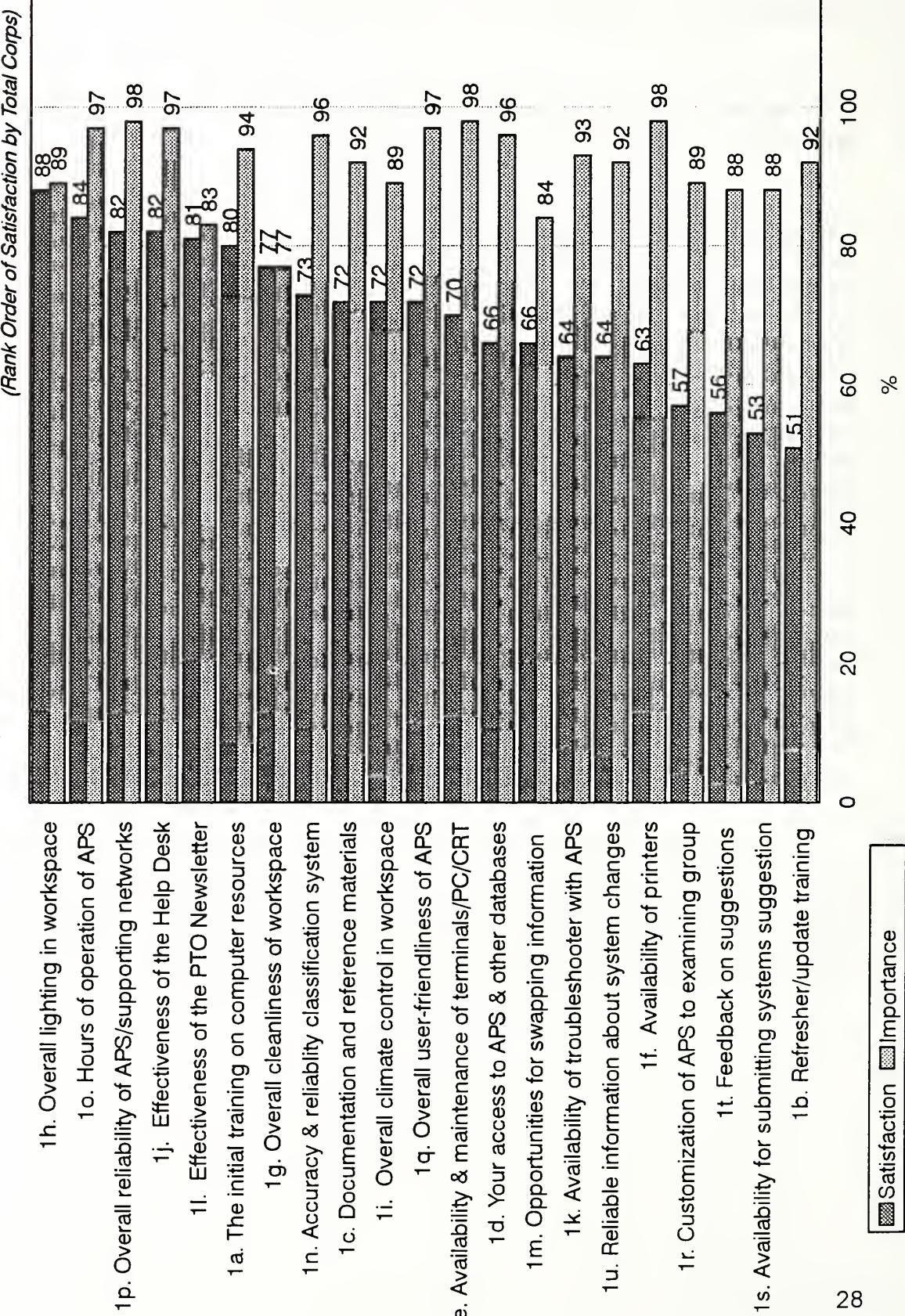
Overall APS reliability scored a general level of acceptability

Given the inclination of most groups to select APS as the surviving research tool -- if they could keep only one -- it is not surprising that survey respondents gave their third highest satisfaction rating to "overall reliability of APS and its supporting networks" (82% satisfied). This ranking was third only to two relatively minor administrative and environmental issues: the hours of operation of APS and the walk-up printers (84%) and lighting in the shared facility workspace (88% satisfied).

Overall Information Resource Assessment

How satisfied are you with the following aspects of PTO's information resources?

Question 1a - 1u



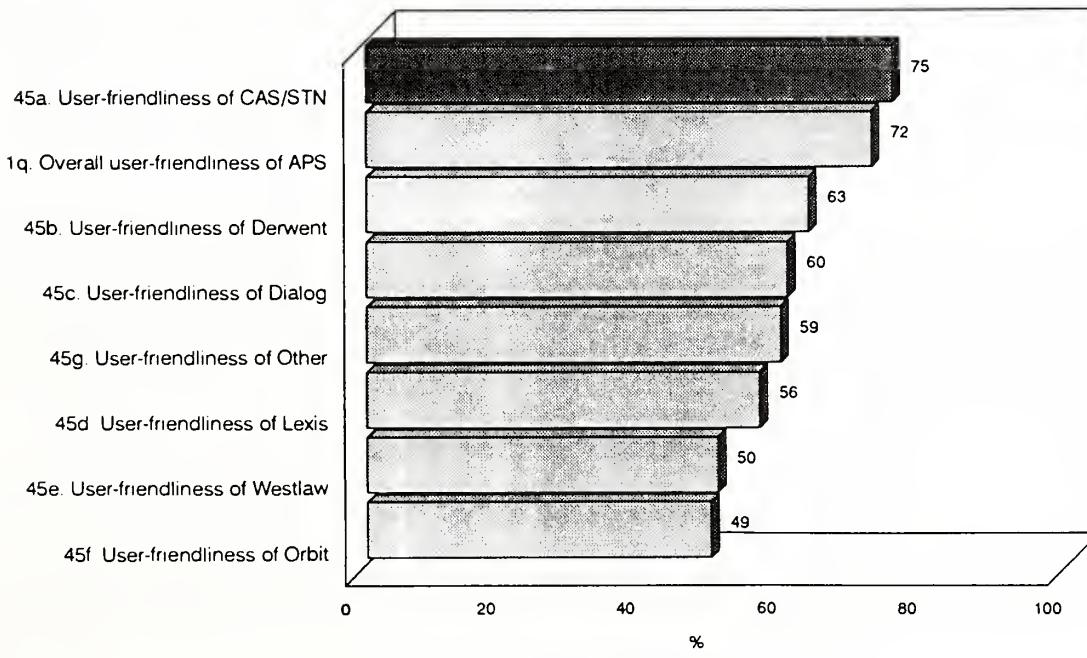
Training satisfaction is a mixed message

The most unmistakable message to emerge from the interview phase was that examiners need more and better training. While commentators spoke positively about the quality and general effectiveness of their initial APS training experience, virtually no one had received refresher training. The need for more on-going training became obvious in each discussion when it became clear that many examiners lacked both computer skills and APS training. Therefore, it was not surprising that examiners rated their initial training experiences in the highest cluster of ratings -- and they gave their worst, rock-bottom score (51%) to "refresher and update training."

Other APS-related measures were rated across the spectrum

Examiners reported acceptance levels that exceeded 70% with all critical APS performance elements -- except for their notable disappointment with the extent to which APS had been customized to meet individual examining group needs (57% satisfied). Three out of four examiners find the accuracy of the classification system to be acceptable. Seven out of ten gave relatively favorable ratings to APS' overall user friendliness. While this rating may appear on its face to be unimpressive, it is important to compare this rating with those given by examiners for all of the other systems they routinely use to perform their searches. As the graph below illustrates, APS compares very well:

APS user-friendliness compared to commercial databases



Examiners' disappointment with how APS has been customized to meet their highly individualized art group requirements was a subject that occupied much discussion time during the interview phase. Consequently, it came as no surprise that almost half of all examiners (43%) are dissatisfied with APS' customization features. A more detailed discussion of this matter is provided in Chapter 9: Future Needs Assessment

Commentators in the focus groups alluded frequently to the lack of availability of terminals and printers when they needed them -- either because not enough existed or because poor maintenance kept them out of commission much of the time. Survey results indicate that a majority of examiners hold these views. Thirty percent (30%) expressed some level of dissatisfaction with the availability and maintenance of the terminals¹ and over two-thirds (37%) are dissatisfied with the availability of printers when they need them. A more comprehensive discussion about availability and maintenance issues is presented in Chapter 5: Performance Indicators.

Some communication and management issues affect user attitudes and effectiveness of APS

Focus group commentators sometimes barraged the interviewers with examples of Help Desk ineffectiveness. They claimed that the Help Desk organization was understaffed and frequently not sufficiently trained to quickly diagnose and help solve the APS-related problems examiners reported. Yet the data indicates that over four-fifths (82%) of all examiners are satisfied with the effectiveness of the Help Desk. This discrepancy between the anecdotal observations and statistical data suggest that for those examiners who most need help and cannot find it, any inadequacy in Help Desk performance is likely to loom larger than life.

The PTO newsletter -- often criticized during the interview phase as being uninformative and not especially useful in educating examiners about APS-related events -- actually received a vote of confidence in the survey itself. Eighty-one percent (81%) of all respondents saw it as an effective tool for keeping examiners informed about system changes, new features and how to use them.

Examiners were more critical of the documentation and reference materials they need to use the equipment, systems and databases to full advantage and focus group commentators made numerous references to their disappointments and requirements in this area. Seventy-two percent (72%) of all survey respondents reported they were either satisfied or neutral on the subject.

¹The deployment of 48 new terminals -- which occurred as the survey was being fielded -- should address some of these concerns.

Acceptance scores dipped below the seventy percent (70%) line in all other communications measurements included in the introductory assessment section. Sixty-six percent (66%) of respondents said they were "satisfied" or "neutral" with opportunities they had to swap information among colleagues about search methods and techniques. This scoring was somewhat better than expected given the inclination of focus group participants to often get sidetracked in spontaneous seminars as they enlightened one another about clever ways to execute searches and use APS more efficiently.

Examiners also gave lower scores (64% acceptance) for "reliable information about system changes and enhancements scheduled for implementation." Examiners claimed in personal interviews that they rarely understood the episodic changes in hardware and software and that, many times, unidentified staff came during the night and reconfigured equipment and software without notice or explanation. They said these events often leave them confused for days about how to use the new processes and that they are usually left to their own devices to determine what to do or how to use the new and sometimes baffling tools.

Interviewees frequently said they were not encouraged to make constructive recommendations for improving APS and related systems. Many were only vaguely aware of the user group representative program² and the role of SIR³ in listening to and articulating examiner suggestions up the management chain. The purpose of the "bug report"⁴ surfaced in several interviews and examiners said they had stopped submitting these reports because no action was ever taken. Not surprisingly then, ratings for satisfaction with both "feedback on suggestions" (56%) and "availability of a channel for submitting suggestions" (53%) were among the lowest ratings emerging from the overall assessment section. Some of this distrust was openly attributed to a management philosophy that prevailed in recent years and is also referenced in Chapter 7: Communication, Management and Support Issues.

²A user group representative is a member of the professional staff of the Patent Cost Center -- part of the Search and Information Resource Administration -- who represents an active liaison for the other members of the Patent Examining Corps to ensure that their automation needs are properly represented and fulfilled by the APS development staff.

³The Evaluation division in the Office of Search Systems of PTO's Search and Information Resources Administration is responsible for determining user satisfaction with current automated search systems and assessing user needs to aid in automation system development.

⁴A "bug report" is a user generated report of technical problems or system performance problems encountered with APS, such as catastrophic system errors, slow log on time, or unclear patent images.

Other environmental and management issues were among other baseline concerns but seen as less significant

Some focus groups participants complained at length about environmental conditions in the workstation space -- some claiming it was too cold, others it was too dark and still others who alleged the space was rarely clean. However, the data indicates that over three-fourths of all examiners are satisfied with this aspect of their work life and do not see these factors as impediments for APS's success.

Chapter 3: USAGE OF RESEARCH TOOLS

No single search tool completely fills the information needs of the examining corps

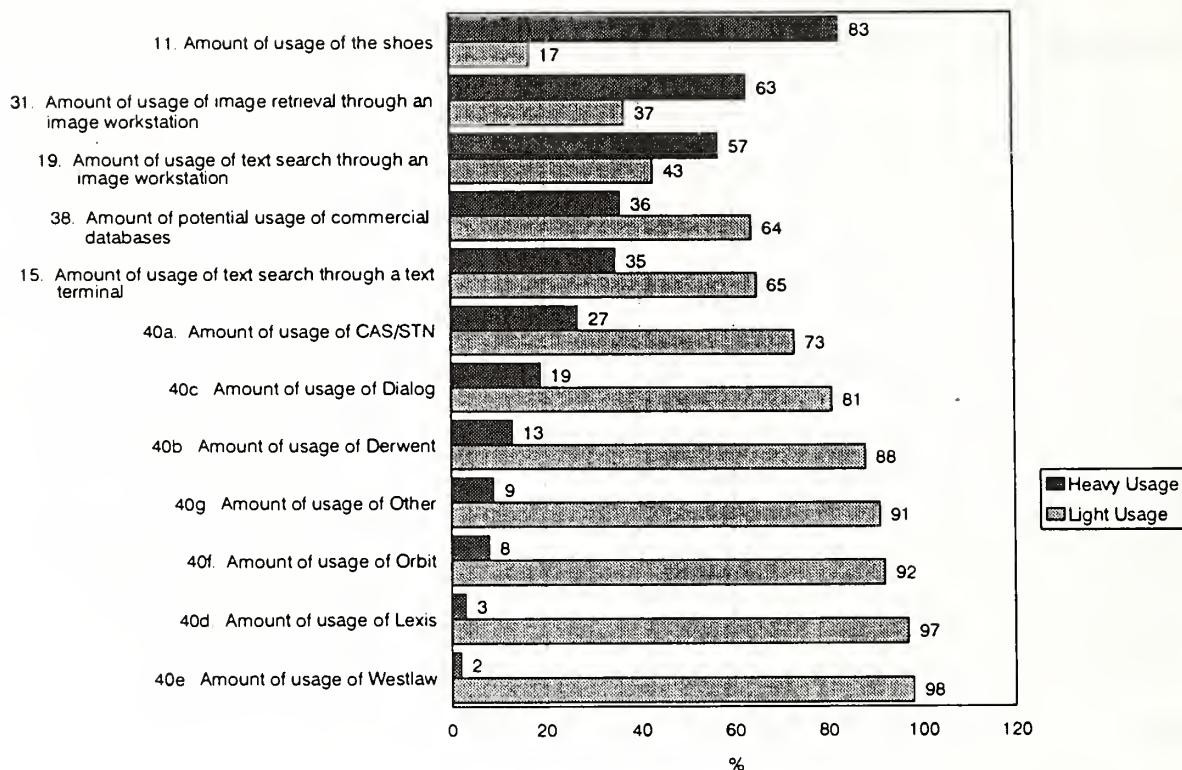
Focus group commentators consistently stressed that no single search tool could currently completely fill their information needs. Search requirements vary from art unit to art unit. Shoe searches or image searches are required in some while word searching simply is not possible in others. The physical state of the shoes varies from art unit to art unit. File integrity is very poor in some areas. In some disciplines, patent information rarely exists in paper form; in others, it only exists in paper form. These variations and requirements are compounded by the fact that individual examiners have different search techniques, computer comfort levels, knowledge of APS's features and functions and experience in working with the shoes. Not surprisingly, the statistical data confirmed that most examiners must use a combination of search tools for each patent application.¹

Examiners still use the shoes on a regular basis

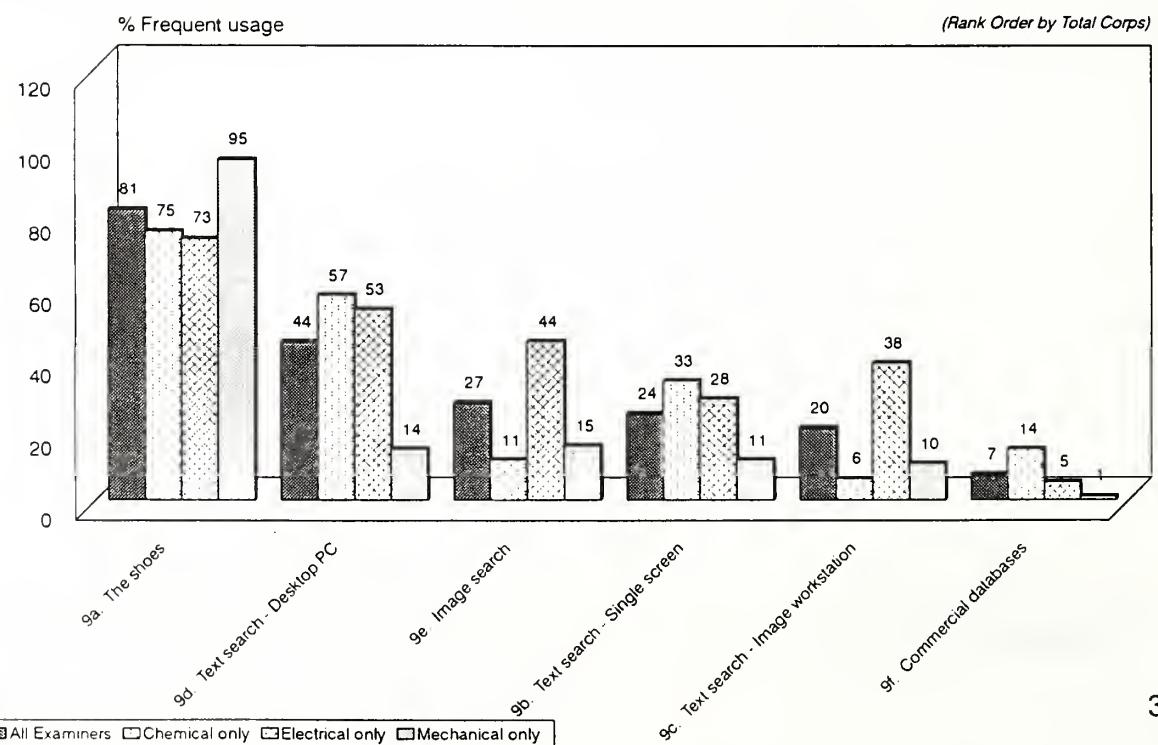
Despite their widespread dependence on APS, focus group commentators reported two primary reasons why they continue to use the shoes. For examiners working in certain arts, the shoes contain information not available through APS -- primarily non-patent literature and foreign art. Some groups -- such as Group 1800 (Biotechnology) -- are required to search the shoes on every application. Other examiners reported that they continue to use the shoes because of limitations in APS, particularly the absence of pre-1971 text.

¹Overall levels of usage are depicted on the charts on the next page.

APS Usage



RESEARCH CHANNEL USAGE



For many veteran examiners, the hand-written marginalia scribbled across the face sheet of the patent documents in the shoes has become a valuable record and cross-referencing tool that was never transferred to APS. Examiners who participated in the focus groups also commented about the value of being able to associate a given patent with a spatial recollection of where the patent was physically located. Those examiners who tended to work "odd hours" liked the perpetual availability of the shoes which are accessible no matter the time of day or night. For examiners who routinely apply certain "art dependent" terms -- such as molecular and chemical structures, mathematical formulas, processes, and material layering -- the shoes are essential because such inquiries are not currently executable on APS. Finally, examiners praise the shoes as a vehicle for allowing them to keep up with the technology in their art area by quickly shuffling through stacks of patents that might interest them.

Survey findings corroborated that there is still almost universal usage of the shoes. Almost all examiners (98%) have access to the shoes and four-fifths (81%) use this research channel on virtually every application. Over four-fifths (83%) indicate they use the shoes nearly every day or at least one or more times per week. Most importantly, almost all (92%) of those examiners with access state that the shoes completely, to a large extent or to some extent fulfill their information needs.

While this is the highest showing of commitment for any of the search tools currently available at PTO, this finding cannot be taken on its face as evidence that examiners prefer the shoes as their primary research tool. Even heavy users of APS Text Search often must also search the shoes because the patents in the automated Text Search system only date back to 1971. Not insignificantly, most of the sixteen focus groups were asked to speak theoretically about what research tool they would keep if they could keep only one: all focus groups chose APS.

However, continued and heavy dependency on the shoes is inevitable until PTO's automated search systems are fully implemented². A major PTO effort will also be required to improve computer literacy and re-orient examiners towards electronic search processes. Reduction in dependency on the shoes is directly tied to the ability of APS to become more comprehensive and to include the text of all patents dating back to 1790, foreign patents and non-patent literature. APS must also become more accessible to examiners -- customized text and image search available right on the desktop. Moreover, examiners must be thoroughly trained in how to make the most of PTO's automated search tools.

²For all of the reasons discussed, it is reasonable to expect that the shoes will be as much a 21st century icon as they were in the 19th and 20th century.

APS supports a substantial percentage of examiners' information requirements

Although most examiners search the shoes on a regular basis, a substantial percentage of PTO's examining corps also rely on automated search tools in the examination process. Examiners were asked a series of questions about how often they used PTO's automated search tools, what aspects of these tools best satisfied their requirements³ and which were most important. The survey data corroborated the extent to which examiners believe that APS is an indispensable research tool.

All examiners have easy access to only one automated search tool: the Text Search capability. Because the Text Search system can be accessed through three different channels -- the shared text terminals, desktop PCs or the image workstation -- respondents were asked to rate these channels separately. Many examiners currently have access to Text Search through their desktop PC as well as through an image workstation or text terminal, and all examiners are expected to have desktop text access by the end of 1994.

Text Search through a shared text terminal received the highest rating in terms of access of all automated search tools. Seventy-three percent (73%) of the examining corps have access to this tool and over one third (35%) of those with access reported that they use it heavily (nearly every day or at least one or more times per week). Half (50%) reported that this tool essentially fulfills their information needs. (Although these percentages do not appear to be unusually high, these ratings reflect only one means of access to APS. Moreover, this means of access will decline as overall migration towards desktop computers in the PTO environment continues.)

³Chapter 5: Performance Indicators addresses examiner satisfaction with the performance of PTO's automated search tools.

The extent of migration toward PCs is underscored by the fact that Text Search through a desktop PC was the second most popular means of access to APS. Most examiners currently have a PC at or near their desktop (93%) and have desktop access to APS Text Search (91%). Most (93%) examiners have PCs that contain Intel 386 chips.⁴ Half (52%) of those who currently have desktop access to Text Search are connected via the PTO Network (PTOnet). Less than two-fifths (39%) are connected via a modem. Focus group commentators reported that while PTO has provided some examiners with modems, other examiners have purchased and installed modems for themselves.

One of PTO's goals is to provide all examiners with desktop access to APS Text Search by the end of 1994 -- and eventually to APS Image Search. At present, one-tenth (11%) of the examining corps does not currently have APS text access at the desktop -- either because they do not have a PC (2%) or their PC is not connected to APS via PTOnet or a modem (9%). In addition, some quarter (26%) of those examiners with desktop access are essentially not able to use it because their PC is not hooked up to a working printer. While these examiners can perform a search at the desktop, they must turn to the shoes, the shared facilities or the Walk-Up Printers in order to get an actual copy of the patents relevant to their search.

Of the three channels available to access APS Text Search, examiners gave text search through a desktop PC the highest rating in terms of its ability to fulfill their information requirements. Over four-fifths (83%) of those examiners who are able to access Text Search from the desktop reported that this tool essentially meets their information needs. Other responses from the survey demonstrate examiners' eagerness to migrate to a desktop environment. Over two-fifths (44%) of examiners with PC access say they access Text Search from their desktop PC on most applications, as compared to 24% who have access to and use text search through a shared text terminal or the 20% who access/use it through an image workstation. Moreover, when asked to rate a series of fifty-five potential enhancements to APS, the examining corps rated access to image and text on the desktop as their number one priority.

⁴Most of the examining corps' desktop PCs use an Intel 386 microprocessor chip. The microprocessor chip contains the central processing unit (CPU) -- a computer's control center. The CPU is a highly complex, extensive set of electronic circuitry that executes stored program instructions and converts data input into information output. The size and composition of the microprocessor chip determines to a great extent the power and flexibility of the computer. The 386 chip replaced the older 286 chip and allowed users to run several software programs at the same time. An even faster and more powerful chip, the 486, has become the industry standard.

According to the survey findings, five percent (5%) of those examiners with a desktop PC currently have a 286 computer; most (93%) have a 386; and, two percent (2%) have a 486. Less than 1% of the corps uses a Macintosh computer. As new features and software capabilities are added to the desktop workstations, PTO will need to upgrade this computer hardware -- by bringing on more 486 computers -- to support advanced applications.

By the end of 1994, all examiners were scheduled to have access to APS Text Search via the PTO Network on their desktop PC. Through the desktop deployment project -- scheduled to begin in FY1996 and to end in FY2000 -- all examiners will be provided with immediate access to image and text search and retrieval, as well as to office automation services and global patents. The installation of upgraded group printers will also be part of this project.

The final Text Search channel available to examiners is through the image workstation. This channel received the lowest score in terms of access -- twenty-two percent (22%) of the examining corps currently has this capability. Although just under three-fifths (57%) of these examiners use it regularly (nearly every day or one or more times per week), three-quarters (75%) say that it basically fills their information requirements. One-fifth (20%) of examiners with access to it, use text search at an image workstation on most applications.

The only way examiners can employ APS's Image Search capability is through the image workstations. As indicated above, only one-fifth (22%) of the corps currently have easy access. Almost two-thirds (63%) of the examiners who have image retrieval access say they use it heavily -- nearly every day or one or more times per week. Over one-quarter (27%) use it on most applications. Over three-quarters (78%) indicate that image retrieval basically meets their information needs.

Despite some reported shortcomings with the current image retrieval system, examiners say they want and need access to the images of patents dating back to 1790. Focus group commentators who did not have access to the image search system eagerly expressed their interest in this technology and the statistical findings confirmed the anecdotal conclusions. Of those examiners who are not currently able to perform image retrieval, over two-thirds (69%) indicated that they want this capability. The ability to access image and text at the desktop -- and to easily switch between them -- was rated as PTO's top priority by the examining corps (78%).

Since initially launching the image retrieval system in 1988, PTO has always planned to make image search available to all examiners.⁵ Examiners in groups 1200, 2100, 2200 and 2300 currently share 100 dual-screen, custom-designed first and second generation workstations that allow them to access the image database using Classified Search and Image Retrieval (CSIR) software. Some forty-eight (48) third generation workstations⁶ and eight (8) new group printers are scheduled to be delivered by March 13, 1995. These workstations will be distributed between Groups 2500 and 2600. Unlike the first and second generation workstations, the third generation workstations are a hybrid of custom-designed and commercially available technology.

PTO is preparing to launch the next phase of image retrieval capabilities. An internal discussion is underway about what technology is best suited to deliver image and text to the desktop of every examiner. New storage technologies are constantly being examined. A decision has yet to be made on whether the terminals need to have two screens or whether one screen would be sufficient. PTO expects to begin supplying the new desktop workstations to the examining corps in FY1996 and to complete this process by the end of the decade.

Commercial databases are an important research tool

There are a number of commercial databases -- notably CAS/STN, Dialog, Orbit, Derwent, Lexis, Westlaw -- that have been made available to certain groups within the examining corps. If examiners have the proper account number, they can access databases that have been "offered" to them at several locations: from their desktop PC, from a shared facility workstation, or at a terminal in the Scientific and Technical Information Center (STIC). Use of these commercial databases seems to be growing, or, as one examiner put it:

With the explosion of knowledge in certain art areas, patent examination has become less dependent on searching the actual patents themselves, and more dependent on being able to search a wide range of databases that collectively describe the current state of the art [including commercial databases and technical literature]. APS has a long way to go in providing that kind of encyclopedic, integrated capability.

⁵In theory, all examiners can use the image workstations should they chose to do so. In reality, however, most examiners are not trained to use this search tool. In addition, the image workstations are located only in certain examining group areas.

⁶These new third generation workstations are called shared use workstations or SUS.

This examiner's critique alludes to the fact that these databases are essentially separate from APS. They all require their own log-in/log-off procedures. Their command structures are inconsistent and sometimes difficult to learn. Most importantly, APS currently provides little or no basis for merging the results of a search conducted across several of these databases.⁷

While over half (54%) of the examining corps does not currently have access⁸ to any commercial databases, nearly three-fifths (59%) of these examiners want this capability and over one-third (36%) say they would use it regularly (nearly every day or one or more times per week).

In some areas, particularly in the chemical and biotechnology examining groups, pre-searchers are made available to examiners to conduct commercial database searches. According to PTO officials, there are two primary reasons for this: 1) It provides examiners in these areas with more time to examine; and, 2) Because of the complexity of the types of commercial databases available at PTO, it is more prudent to let experts use the databases in order to minimize time (and thus cost) logged on to the databases.

PTO's examining corps is a heterogeneous professional community with different information needs and skill levels

Both focus group comments and survey findings illustrate that examiners have strikingly different needs for electronic tools. Focus group sessions, which included participants from all sixteen examining groups, confirmed that there are significant differences in the information needs, work methods, and perceptions about how APS is impacting the search process in various art groups. Not only is the very nature of the search process different, but examiners bring to the job their individual work habits and familiarity with electronic tools. These differences -- both individual and art group -- have enormous implications for how PTO should develop information tools to facilitate the work of the patent examining corps.

⁷One examiner in Group 2100 has designed a program called Document List Manager that, to a certain degree, allows an examiner to duplicate a search across the spectrum of electronic information resources available -- from APS to examiner digests, to the array of sanctioned commercial databases. While 2100 is the only group currently approved to use "Doc List Manager," other PTO organizations have shown a keen interest in the program's Janus feature -- which pulls up every patent that is cited on a "good reference" (the past) as well as every patent that cites that same reference (the future) -- and it may be included in the Examination Toolkit project.

⁸Access to commercial databases is influenced by many factors -- the most overwhelming being cost. However, for various personal reasons, many examiners are not attracted to this research tool.

The extent of these differences is dramatized by the fact that while nine out of every ten examiners working in the mechanical groups find that the shoes fulfill their information needs, only half of examiners in the chemical groups find that to be the case. Not surprisingly, mechanical group respondents (78%) were satisfied with the speed with which they could search the shoes, while only sixty-five percent (65%) of chemical group respondents were so satisfied.

One-third of the examining corps considers themselves to be computer novices

During the focus group sessions, examiners described themselves as having a wide variety of computer skills. One senior examiner revealed a colleague had provided him with a diskette that automates all log-in procedures and brings him directly to the search prompt. Without this diskette, he reported, he would not be able to use APS at all. Other examiners demonstrated a high level of computer sophistication as they described how they overcame limitations in APS's search structure or used advanced software applications in order to make APS more user-friendly.

The current level of computer expertise among examiners is a serious deficiency that limits the ability of the corps to fully maximize APS's power. Almost one-third (30%) of the examining corps described themselves as a complete beginner or a novice who still had much to learn. Almost half of the corps (44%) rated themselves as intermediate users. Only one-fourth (27%) consider themselves to be an advanced user or computer pro.

The extent to which examiners are computer literate influences their ability to grasp and retain what they learn in training sessions; their readiness to use electronic tools on a regular basis in the search process; their dependence on the shoes; their level of tolerance when APS malfunctions; and their overall criticisms of the information tools available to them at PTO.

Dependence on search tools is related to the types of applications examined

Dependence on APS is also related to the types of applications examined by each of the patent examining corps' examining groups and art units. The corps is divided into sixteen broad examining groups -- five groups examine chemical-related patent applications, six examine electrical-related applications, and five examine mechanical-related applications. Each of these larger groups is further broken down into four to sixteen subgroups, or art units. According to our survey findings, thirty-two percent (32%) of the corps consider their art to be predominantly chemical, thirty-five percent (35%) electrical and thirty-three percent (33%) mechanical.

Each of these examining groups and art units have different needs in terms of the types of searches required and the types of searches that work best. Focus group participants said that shoe search is "mandatory" for some groups, while others must perform APS text or image searches. They also emphasized that in certain arts, such as biotechnology and information processing, examiners use APS on virtually every case. Examiners in other arts, particularly mechanical, may use APS only once or twice per month. The statistical data confirms the observations made by focus group commentators.

Almost all mechanical examiners (93%) use the shoes on a regular basis, compared to just over three-quarters of chemical (76%) and electrical (79%) examiners. Most mechanical (98%) and electrical (92%) examiners indicate that the shoes essentially fulfill their information needs and over four-fifths of chemical examiners (86%) are as satisfied with the shoes in terms of meeting their information requirements.

In addition, mechanical examiners indicated that they use APS and other automated search tools on a less frequent basis than chemical and electrical examiners. For example, two out of ten mechanical examiners stated that they use text search through a shared terminal on a regular basis, while four out of ten electrical and five out of ten chemical examiners use it regularly. Three-quarters (76%) of the electrical examiners and half (48%) of the chemical examiners use image search on a regular basis, compared to two-fifths (39%) of the mechanical examiners. Seven out of ten mechanical examiners state that text search through their desktop PC fulfills the information needs of their job, compared to nine out of ten chemical examiners. And, almost no mechanical examiners indicated that they use any of the commercial databases on a regular basis.

Chapter 4: ACCESS TO RESEARCH TOOLS

Examiners need comprehensive and consistent access to PTO's automated search tools

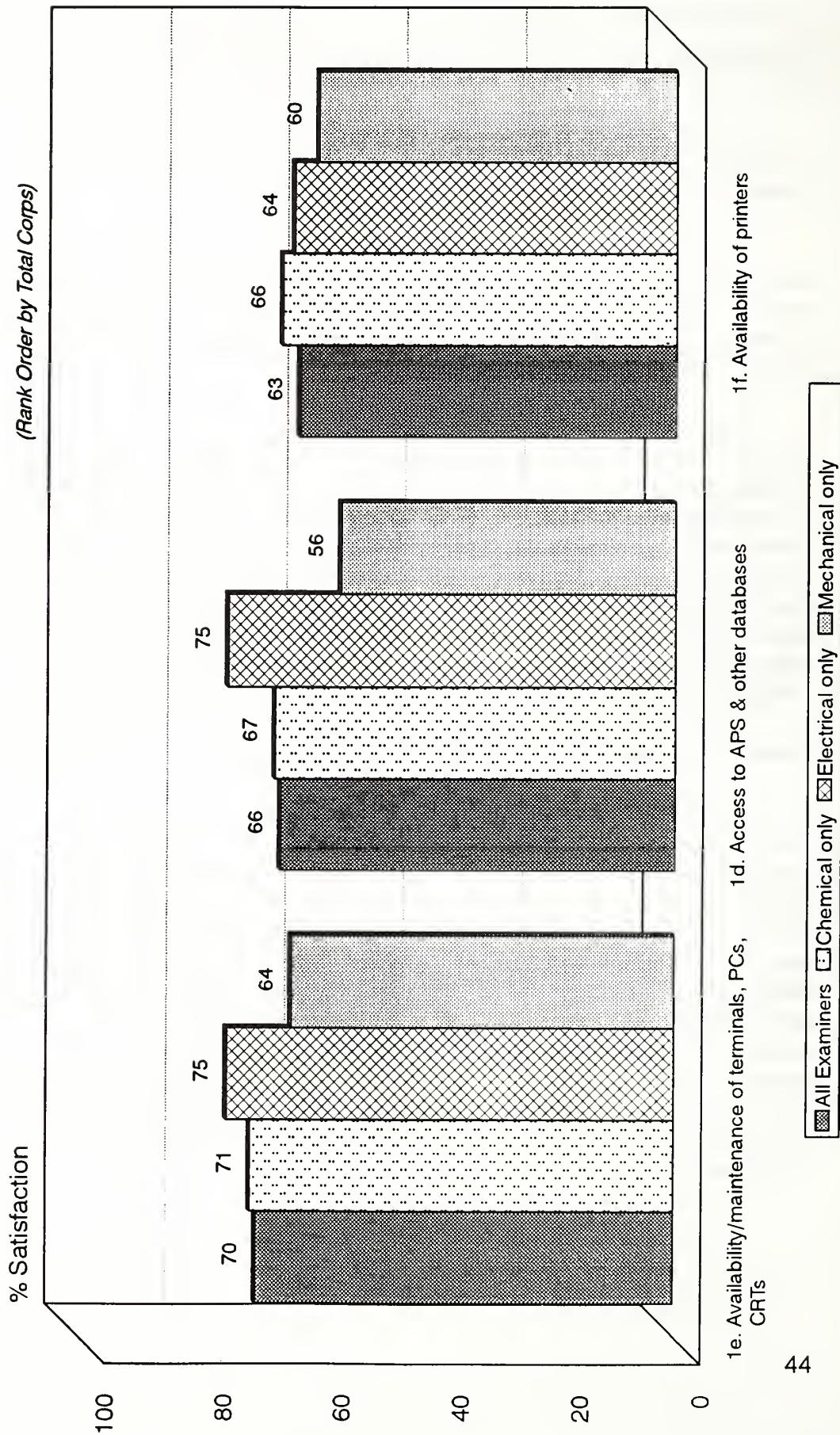
During the focus group sessions and interviews, examiners and managers alike identified a critical measurement of the effectiveness of APS and other automated search tools -- to what extent can examiners actually use these capabilities? Access to these tools is essential if examiners are expected to employ them on a regular basis in the examination process.

Access to date, however, is neither comprehensive nor consistent. Some examiners have access to Image Search, others do not. Some access Text Search through a shared terminal, others through a PC, and still others through an image workstation. Some examiners are able to search commercial databases and to take advantage of graphical user interfaces on the PC; other examiners either lack access to these tools or just do not know how to use them. In addition, focus group commentators reported problems with log-in IDs and passwords and maintenance of terminals and printers. Clearly, examiners cannot use PTO's automated search tools and related equipment if they do not have access to these resources or if, for one reason or another, they just are not available when examiners want to use them.

Examiners express dissatisfaction with their access to PTO's automated tools

Examiners were asked a number of questions throughout the survey in order to clarify the access issue. In the first section -- overall information resource assessment -- examiners were asked one direct access question and two related questions. The responses to these questions are depicted on the following page. Just over one-third (34%) of examiners expressed their dissatisfaction with their "access (hook-up) to APS and other databases needed to do (their) job." This is particularly true of mechanical examiners, almost half (44%) of whom indicated dissatisfaction with their access to automated tools. Examiners also expressed dissatisfaction with the availability of equipment needed to access PTO's automated tools -- terminals, PCs, CRTs, and printers. Thirty percent (30%) of the examining corps indicated that they are generally or very dissatisfied with the "availability and maintenance of terminals, PCs, and CRTs to do (their) job." Almost two-fifths (37%) expressed dissatisfaction with the availability of printers.

OVERALL ASSESSMENT SECTION: ACCESS AND AVAILABILITY



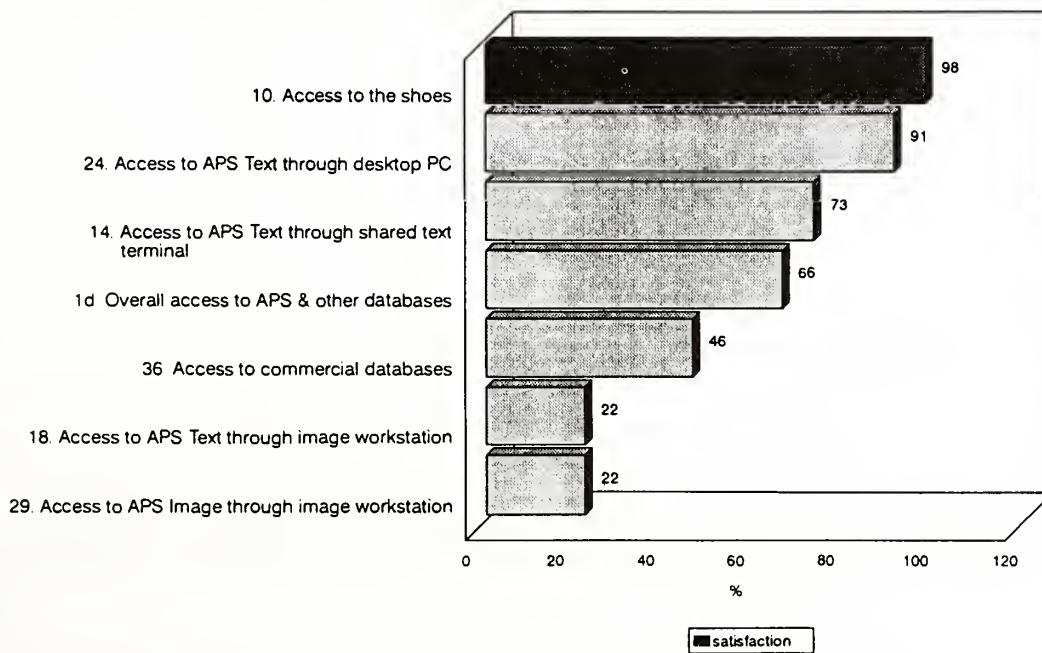
Examiners' access to PTO's automated tools is varied

Examiners were also asked to indicate whether or not they had access to each of the primary -- automated and non-automated -- search tools available at PTO: the shoes, text search through a shared terminal, text search through an image workstation, text search through a desktop PC, image search at an image workstation, and commercial databases. The data (illustrated below) indicates that while almost the entire examining corps has access to the shoes, access to the other channels -- all of which are automated -- is varied.

The entire examining corps has access to APS Text Search. However, not all Text-accessible channels are available to all examiners. Seven out of every ten examiners said they have access through a shared, single-screen text terminal. Two out of ten said they have access to Text Search through an image workstation. Nine out of ten examiners said they currently have access to Text Search through a desktop PC.

Less than one-quarter (22%) of the examining corps currently has access to APS Image Search. Just under three-fourths (69%) of examiners -- spread fairly evenly among chemical, electrical and mechanical examiners -- who currently don't have access to an image workstation indicated they would like to be able to use this critical search tool. Given the fact that image retrieval at the desktop -- through the desktop deployment project -- will not be available to all examiners until the end of the decade, demand for access to the image workstation will surely increase over time as more examiners become exposed to its capabilities.

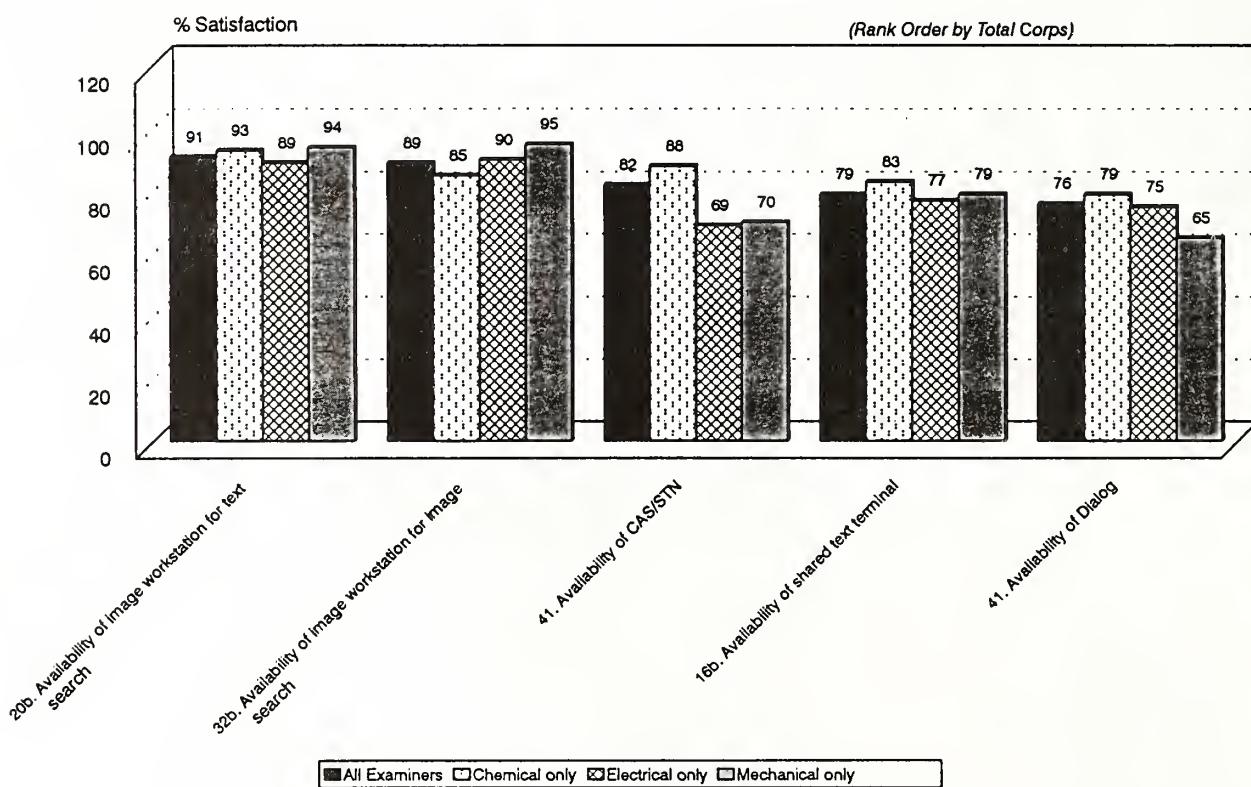
Access to Search Tools



Over half (54%) of the examining corps does not currently have access to any commercial databases and three-fifths of these examiners indicate that they want access to this search tool.¹ Chemical examiners currently have the greatest access to commercial databases and the strongest interest in acquiring more access. While mechanical examiners have the lowest access rate (17%) for commercial databases, just under half (47%) of those who do not currently have access want to be able to use these tools.

Examiners' access to these search tools is also impacted by the availability of automated systems at any given time. Terminals used to access these systems may be in use or out of order. As depicted in the chart below, examiners are most satisfied with the availability of the image workstations -- not surprising since less than a quarter (22%) of the examining corps currently has access to this equipment. Chapter 5: Performance Indicators further explores this issue of availability.

AVAILABILITY



¹Some commentators we spoke to indicated that the cost of connect time and system usage for commercial databases limits or restricts access to these systems for many examiners.

Complete APS Text Search access through PCs is impacted by other factors

Many examiners who participated in the focus group sessions claimed that they could not access APS through their desktop PC because the appropriate management organization did not have enough (constant) log-in IDs and/or (changeable) passwords to give to all examiners. They were unable to explain whether this perceived "shortage" was due to some inadequacy within APS itself (the mainframe), to PTOnet, to both -- or to neither.²

The survey results indicate that as of late October, 1994, fully ninety-three percent (93%) of the examining corps had one or more PCs on their desktop. Three-quarters (74%) of those PCs were hooked up to a working printer and ninety-one percent (91%) of those PCs had some access to APS Text Search -- fifty-two percent (52%) through PTOnet and thirty-nine percent (39%) through a modem. This means that nine percent (9%) of all examiners with a PC still have no access to APS Text Search in any way -- and an additional thirty-nine percent (39%) can access APS only through slower, more trouble-prone modems.

Altogether then, at the time the survey was fielded, approximately half of the examining corps was not yet hooked up to PTOnet nor to any of the office automation potential that PTOnet enables. Survey results should look very different three months from now because PTO is planning to provide desktop PTOnet access to all examiners by December 31, 1994. If PTO management's IRM schedule is followed, additional file servers will be installed in November-December, 1994. (In fact, four file servers were deployed during the drafting of this report, adding hundreds of examiners to the network.³)

²Interviews with PTO managers and CIO personnel revealed that there is no inherent limitation with regard to the number of access IDs for either PTOnet or the mainframe.

³These additional file servers will enable all examiners to go onto the PTO network and eventually access a full array of office automation products, of which APS Text Search is only one.

Access to commercial databases is also expected to grow

While focus group commentators expressed a growing need for access to commercial databases in the search process, the data reveals a relatively low level of usage of this search tool. This low usage rate could be influenced by a couple of factors. First, examiners are currently not able to easily transfer a search strategy from APS text or image to a commercial database or even between databases. Almost two-thirds (63%) of the examining corps reported that more consistent commands across all databases used at PTO would have a significant positive impact on their job performance. Almost three-fifths (59%) stated that the ability to access a variety of databases in one session without having to log on and off of each one separately would also be useful to the examining corps.

Secondly, many examiners must leave their immediate work area to access commercial databases. Some three-fifths (57%) of examiners said that the ability to access all commercial databases from their desktop PC would have a significant impact on their job performance. Examiners rated this as one of PTO's top fifteen priorities out of a list of fifty-five potential enhancements to APS.

PTO has already recognized the importance of commercial databases in the search process. In the most recent PTO strategic plan -- the *Strategic Information Technology Plan: FY1995-FY2000* -- specific steps are outlined to make this search tool more readily available and accessible to the examining corps. As part of the planned Examination Toolkit project, PTO will deliver an enhanced commercial database access tool to the examiners' desktops by September, 1995. This tool will include document manager features that facilitate the transfer of search strategies across all automated search tools.

Better communication about graphical user interfaces can make APS more accessible

The Examination Toolkit project is not PTO's first attempt to develop software applications that make aspects of APS more accessible to the examiner. Within the last year, PTO's Information System division created communication software that included graphical user interfaces (GUI) -- WinCom (the hard disk interface) and WinNet (the PTO Network interface) -- which allow examiners to operate APS at the desktop in a more user-friendly, Windows-like environment.⁴ Focus group commentators reported that PTO had done a poor job of both communicating the availability of these GUIs as well as training examiners to use these tools, and the statistical data gathered in the survey confirmed their observations.

Survey findings reveal that while almost half (46%) of those examiners with desktop APS access are using WinNet, only one-tenth (14%) are using WinCom. Less than one-fifth (16%) are not using either WinCom or WinNet and an amazing quarter (24%) are not sure if they are using WinCom or WinNet. These findings compare with focus group sessions, during which commentators revealed that many examiners are not aware of either the value or availability of these GUI. Other examiners prefer non-CIO-supported products, such as PROCOM, that they sometimes purchase and install themselves.

Migration towards the desktop environment will reduce demand for shared APS facilities

The need for access to all but one of the APS-dedicated channels is expected to decline over the next five years as PTO migrates its search systems to a desktop environment. Shared, single-screen text terminals are being phased out as more examiners become hooked up to PTOnet at their desktop PC. The final, third generation, image workstations will be deployed to Groups 2500 and 2600 by mid-March, 1995. No more plans are underway or envisioned to develop new or better shared APS facilities. The new generation of APS-dedicated automated tools will be developed as desktop terminals which can access Text Search, Image Search, and the to-be-developed Global Patents and Non-Patent Literature Systems all in a user-friendly, Windows-based operating environment.

⁴Microsoft's Windows product is one of the most popular graphical user interfaces (GUI) available for PCs. Instead of having to remember a command to type to open a program or execute a function, Window users make selections from choices available on the computer screen. Users select an option by clicking on it -- whether it is an icon or a written function -- with a mouse button. Windows allows users to multitask -- run a number of applications at the same time. In several windows on the computer screen, a user can pull up a spreadsheet program, a word processing program and an electronic mail program.

Chapter 5: PERFORMANCE INDICATORS

Examiners are committed to APS as a productivity enhancer

Focus group commentators were virtually unanimous in their support of APS as a productivity enhancer. APS currently enables examiners to search three monumental databases of patents and patent abstracts -- U.S. Text, U.S. Image and Japanese Abstracts. Other databases -- more text, global patents, non-patent literature -- are expected to be added to the system in the future. Focus group commentators predicted that dependency on APS will increase even more as the body of patent and related technical information expands and full search capabilities reach the desktop.

Although examiners may be dissatisfied with certain aspects of the tools which allow them to access APS, they clearly depend on these tools to perform their job. Looking across-the-board at examiners' ratings of the extent to which any given tool fulfills their information requirements, they expressed a high level of commitment to PTO's automated search tools. Half (50%) of those with access to text search at a shared use text terminal indicate that it essentially meets their information needs. Three-quarters say that text search at an image workstation (75%) and image search at an image workstation (78%) meets their needs. And over four-fifths (83%) indicate that text search at the desktop meets their needs.

As the number of patent applications continues to increase, as well as the body of foreign patents and non-patent technical literature, examiners' dependency on APS will increase as the need to sift through mounds of information also rises. PTO received 186,123 patent applications in FY1994 and this number is expected to grow to 225,000 by 1999.¹ Not only are there more applications to examine, there are more patents -- both foreign and domestic -- to search and non-patent literature to review. Not surprisingly, examiners rated the ability to search foreign art abstracts and commercial databases from the desktop as two of PTO's top fifteen priorities out of a list of fifty-five.

¹File integrity is widely perceived as APS's strongest suit. Examiners particularly welcome APS's ability to search millions of domestic patents with almost 100% file integrity without having to leave their own work area. The reliability of a shoe search is consistently compromised by the fact that all patents are not always available to search and review. One-third (33%) of the examining corps indicated in the survey that they were generally or very dissatisfied with the file integrity of the shoes.

Despite examiners' increasing reliance on the system, APS is clearly not meeting some of their requirements. During the focus groups, examiners seemed to be quietly frustrated about a system that continues to disappoint them in some ways. The recent survey allowed examiners to express their satisfaction -- or dissatisfaction -- with the performance of PTO's automated search tools and related equipment. This chapter describes these performance indicators and includes data on the network which supports the automation program.

While usage of APS is going up dramatically within the examining corps, relevant data on the potential impact on productivity is available from multiple sources. Thoughtful analyses must take many variables into account.

The following question was asked throughout the survey instrument: "To what extent does [this information channel] fulfill the information needs of your job?" The responses to this series of questions yielded the following results:

(Base: Examiners with access to each specific channel)	
Information Channel	Percent "Completely," "To a large extent" or "To some extent" fulfills information needs
The shoes	92%
Text search through a desktop PC	83%
Image retrieval through an image workstation	78%
Text search through an image workstation	75%
Text search through a shared, single-screen text terminal	50%

Although these results indicate that the shoes may still be the primary source of patent information (particularly since pre-1971 text is not available on APS), electronic channels are an indispensable part of the mix. It is only through automated search channels that examiners can "pre-screen" vast amounts of material within specified classes and sub-classes and to eliminate duplicates. In fact, "hard data" -- in the form of monthly reports to senior management -- show usage of both text search (Messenger) and image retrieval (CSIR) increasing by leaps and bounds within the examining corps during the past few years, even though the number of examiners has increased only slightly:

Approximately 209,000 total session hours [on all PTO search applications] were logged by examiners in FY93, which was 19% greater than FY92. (Information Systems Executive Report, September, 1994, Page ES.2)

A comparison of the last 12 months to the same period of the previous year shows Messenger hours have increased 30%, CSIR hours up 51% [these statistics reflect mostly examiner users, but also public users and "other" users]. (Information Systems Executive Report, September, 1994, Page ES.2)

The peak number of examiner session hours on Messenger occurred in September 1994 with 15,088 hours logged. There were 95,046 session hours logged by examiners during FY93 which was 14% greater than FY92. Session hours for FY94 are up 30%. (Information Systems Executive Report, September, 1994, Page 1.2)

Patent examiners currently account for 74% of all Messenger text searching. The number of examiners has remained relatively stable, showing an annual growth rate of approximately 5%. There was an average of 1,390 examiners in FY92, increasing to 1,482 in FY93. During the last 12 months an average of 1,546 examiners have used Messenger which is up by 4% over the previous 12 months. (Information Systems Executive Report, September, 1994, Page 1.2)

A comparison of the last 12 months against the previous twelve months shows a 51% increase in CSIR session hours by all users and an increase of 36% by examiners. (Information Systems Executive Report, September, 1994, Page 2.2)

During FY93 examiners logged 67,878 hours on CSIR which was 55% greater than FY92. Session hours have increased by 51% over the last 12 month period. (Information Systems Executive Report, September, 1994, Page 2.2)

Drawing straightforward conclusions from this available "hard" data regarding the overall productivity impact of APS requires an understanding of both the unique requirements of the system and the many factors that must come into play.² For example, PTO's annual reports show that total applications filed per year³ went up fifteen percent (15%) between 1989 and 1993:⁴

<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
163,306	174,711	178,083	185,446	188,099

Pendency time of average patent application, in months, went up six percent (6%) in this period:⁵ (Note that during the same period, total applications filed increased by fifteen percent (15%).)

<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
18.4	18.3	18.2	19.1	19.5

In addition, the number of appeal cases filed per year went up seventeen percent (17%):⁶

<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
3,829	3,356	3,649	4,281	4,487

²It may be useful to recall that ten years after the introduction of the first PCs, management experts were hard pressed to find major, measurable impact on the productivity of the U.S. economy -- yet no one could conceive of life without the PC. One suspects that either the "measurement" of productivity was inadequate, or our way of doing work has been qualitatively -- if not quantitatively -- changed. The issue of "productivity impact" as traditionally measured is therefore somewhat moot.

³These figures include Design patents.

⁴U.S. Patent and Trademark Office, *Annual Report*, FY1993, page 53.

⁵U.S. Patent and Trademark Office, *Annual Report*, FY1993, page 53.

⁶U.S. Patent and Trademark Office, *Annual Report*, FY89, page 57. U.S. Patent and Trademark Office, *Annual Report*, FY90, page 62. U.S. Patent and Trademark Office, *Annual Report*, FY91, page 65. U.S. Patent and Trademark Office, *Annual Report*, FY92, page 60. U.S. Patent and Trademark Office, *Annual Report*, FY93, page 57.

During the same period, the number of decisions affirmed actually *declined* by nineteen percent (19%) -- a statistic that must be balanced by the fact that the total number of patent decisions rendered *increased* by the same percentage (19%). Although the size of the examining corps increased -- as the table below illustrates -- the age and experience levels of the examiners was trending downward and their APS and other automated tool training opportunities were limited at best.

During that period, the number of full-year patent examiners and SPEs (excluding detailees) went up twenty-eight percent (28%):⁷

<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
1,445	1,472	1,796	1,768	1,851

Informed PTO commentators say that the length and complexity of the average patent has increased between 1989 and 1993. Appeals decisions by applicants can be made for a variety of reasons, including the applicant's desire to delay publication and, hence, dissemination of his/her patented information to the public. This decision has nothing to do with the quality (or lack thereof) of an examiner's decision.

Many focus group participants observed that electronic search and retrieval offers the only hope of staying on top of the expanding base of patent and non-patent literature. Likewise, electronic search and retrieval offers the only means of serving an ever-expanding number of "outside" users (domestic and foreign) and satisfying the increasing demand for patent copy sales.

Therefore the question is not whether to go forward with APS or "back to the shoes," but how to further fine tune APS to the needs of the various user communities in order to increase its impact on the way that work gets done.⁸

Survey data indicate that equipment availability and maintenance is acceptable in image workstation areas, not acceptable elsewhere

Many focus group commentators said that on any given day, many of the terminals or printers could be out of commission in the shared facility workspaces, and those problem cases are said to sometimes go unattended for days on end. Others, however, tended to dispute such claims, and cite data that suggests good maintenance of the equipment and prompt response to problems reported.

⁷Patent Production Model

⁸ A number of graphs derived from PTO reports pictorially depict illustrative trend data on volume of applications, pendency and appeals. See Appendix D.

The survey produced the following "acceptance scores"⁹ concerning the availability and maintenance of equipment in PTO's search and retrieval workspaces:

	Text search through a shared text terminal	Text search through an image workstation	Image retrieval through an image workstation
Availability of a terminal when you need to use it	79%	91%	89%
Operability and maintenance of terminals and CRTs in the shared facility workspace	61%	71%	76%
Operability and maintenance of printers in the shared facility workspace	47%	79%	Not asked

As the chart illustrates, the acceptance score for availability of terminals in the image workstation areas is quite high (91%/89%), while the corresponding score for the shared text search areas is significantly lower (79%). The acceptance score for operability and maintenance of terminals and CRTs in the image workstation area is lukewarm (71%/76%), and again the corresponding score for the shared text search areas is significantly lower (61%). The acceptance score for operability and maintenance of printers in the image workstation areas is quite respectable (79%), while the corresponding score for the shared text search areas is exceptionally poor (47%).

The latter findings can be summarized in descending order as follows:

Issue	Acceptance Score
Availability of an image workstation when needed	90% (avg)
Operability and maintenance of printers in image workstation workspaces	79%
Availability of shared text search terminal when needed	79%
Operability and maintenance of terminals and CRTs in image workstation workspaces	74% (avg)
Operability and maintenance of terminals and CRTs in shared text search workspaces	61%
Operability and maintenance of printers in shared text search workspaces	47%

⁹The figures for "text search through an image workstation" and "image retrieval through an image workstation" are virtually identical -- which is what one would expect, since these ratings pertain to the same "image workstation" workspaces. These figures are accurately reflecting the perceptions of the examining corps across the broader range of items.

These results suggest a "two-tiered" situation has developed within PTO: image workstations are in good supply and are relatively well-maintained for the handful of groups that currently use them. However, only one-fifth (22%) of the patent corps have access to image workstations. The seventy-three percent (73%) of the corps that have access to shared text terminals find those terminals less available and less well maintained.

Probably the best available "hard" data on the availability of APS equipment is the "Statistical Overview on APS Usage" published monthly by the Search and Information Resources Administration. One series of graphs in that report shows the maximum number of (image) workstations that were in use at one time each day, for each of the four current user groups.¹⁰

In Group 1200, for example, there were no more than six image workstations (25%) in use at one time on a couple of days during the month of August, 1994, while there are a total of twenty-four workstations in that group. (One commentator said that Group 1200 got the workstations fairly recently, and is not yet "in business.")

On the other hand, Group 2100 shows a maximum of twenty-three workstations (79%) in use at one time on a couple of days during the month of August, 1994, while there are a total of twenty-nine workstations in that group. This suggests that the overwhelming percentage of workstations in that group were available and in good working order.

The same pattern appears in Group 2200 and Group 2300 -- usage of image workstations only approaches the maximum number available on a few days during the month.

One of the exhibits in this report shows the number of image workstation malfunctions reported to the Help Desk and requiring customer support intervention. The maximum number of "incidents" from the four combined user groups (1200, 2100, 2200, 2300) never exceeded seven on any day in August, 1994 (the current standards threshold), while the number of image workstations in these groups was ninety.

According to one group director, availability of image workstations tends to be 90% or better within the current user groups. In the opinion of that director -- who currently heads an examining group that doesn't have image access -- availability of image workstations has never been a significant problem in the group he headed that had image access.

¹⁰See Appendix D for exhibits.

However, examining groups with image workstations comprise just over twenty percent (22%) of the patent examining corps, and there are no comparable exhibits in the monthly Statistical Overview that show the availability of shared text search terminals for the remaining bulk of the corps.

Availability, accessibility and maintenance of printers are essential factors to APS satisfaction

Examiners are able to print out text and images from the APS system from four sources: local printers connected directly to an image workstation or text terminal, group printers networked to an image workstation or text terminal, a walk-up printer that has no search capabilities but can print out any requested patent, and networked printers that are connected to desktop PCs (these are often located in group secretarial stations). The printers available to examiners are a mixture of laser printers and dot matrix antiques.

During the interview phase, examiners expressed widespread criticism of printer maintenance and technical support. Some examiners claimed that the local, group and walk-up printers are constantly running out of paper or toner and that the printers are often out of commission altogether. Although examiners are instructed to not touch the printers and to immediately call the Help Desk for printer support, the unhelpfulness and, more importantly, untimeliness of the support offered has led some examiners to do their own printer servicing anyhow.

The focus groups also surfaced two concerns about the printing out of a selected patent or set of patents. The first concern is that the APS terminal gives the examiner no indication of the number of pages in a given patent. Once the print button is hit, there is no easy way to stop the process -- even if it's an 800 page "jumbo" patent that can potentially tie up the printer for hours. While many examiners seemed happy to have walk-up printers available to them, others complained about the printer churning away to produce "jumbo patents" in their entirety while only a single page was of value to the search underway.

The second complaint stemmed from the "error processing report" notices that are printed out if a page is not available. An examiner might request a copy of a patent from one of the walk-up printer terminals but receive instead a set of error processing report notices -- one for each page of the patent that is not available!

The quality and maintenance of printers in the shared text terminal areas poses problems for some

The printers in the shared text terminal areas are judged to be in poor condition and are sometimes dot matrix antiques. At the same time, it should be borne in mind that group printers¹¹ (walk-up printers) are now producing the bulk of required patent copies for the examiners, so the poor condition of printers in the shared text terminal areas is perhaps less critical. In addition, text search through the desktop PC is likely to become the dominant channel within the next twelve months -- if it is not already -- so future printers will be needed near the desktop. In the future, shared text search areas are likely to be used only as a back-up.

System reliability is an issue for some examiners, despite the favorable picture shown by survey data and "hard" data

Overall reliability of APS and its supporting networks received the third highest approval rating among the twenty-one initial factors measured in the survey. This was somewhat surprising, given the fact that poor system reliability was one of the complaints from many examiners interviewed. As one examiner said:

You run into a system outage, a freeze-up, or get kicked off the network for no apparent reason -- about once or twice a month -- and several hours of work may go down the tubes.¹² That happens often enough to make you real gun-shy about using the system [especially the image workstation].

¹¹Earlier versions of the group printer were somewhat "fragile" and often held up delivery of documents to the requesting examiner. Current versions, however, are much improved. The availability standard of 95% or higher is being met, with rare exception.

¹²System outages and freeze-ups are particularly frustrating because of the fact that some of PTO's automated search systems -- particularly the shared use facilities -- do not have an automatic save or back-up feature. If an examiner has worked for an hour on a search and the system goes down, that hour of work is lost and has to be completely reconstructed.

In considering the issue of system reliability, the following points should be borne in mind:

- An incident of "system failure" -- from the patent examiner's point-of-view -- could be the result of a mainframe outage, file server outage, network outage, software failure (application specific), workstation failure, or even a printer failure. Available statistics suggest that the first three causes -- mainframe outage, filer server outage, or network outage -- are relatively rare but not unknown. But add these together and factor in the additional elements of "software failure" and "local equipment failure" (reflected to some extent in "Help Desk Incident Reports"), and the issue of "system reliability" attains significance to many users.
- Regardless of the precise cause, it takes only one or two instances of losing work to develop a jaundiced view of "system reliability." Moreover, that negative perception may persist several months after a problem situation has been remedied. It is possible that some criticism heard in the focus groups regarding system reliability reflected a few "catastrophic" failures over the past several months.

The monthly "Information Systems Executive Report," produced by the Capacity Planning and Performance Management Division, provides PTO's senior management with the best available "hard" data regarding PTO's "system reliability." One section of this report deals with "Messenger [text] Availability" and "CSIR [image] Availability" -- which reflects primarily maintenance of hardware and software.¹³ The report for August, 1994 shows that Messenger availability during scheduled operational hours was 100% that month; cumulative availability for the most recent twelve month period was 99.7%; and two recent "bad" months were June, 1993 (slightly higher than 97% availability) and May, 1994 (slightly lower than 97% availability).

The same report shows that CSIR availability was 100% for August, 1994; cumulative availability for the most recent twelve month period was 99.7%; and two recent "bad" months were June, 1993 (98.5% availability) and May, 1994 (97% availability).

When compared to both government and private sector "mega-systems," the latter figures reflect exemplary performance. However, seeing that there have been months when text or image was "down" even 3% of scheduled hours (and total down time could be greater than that in certain areas, factoring in possible localized problems with the network), it is understandable that at least a few examiners might complain.

¹³See Appendix D.

Another section of the same report -- titled "Problem Management System Reports" -- reflects the distribution of hardware and software problems reported through the Help Desk and through other, more direct PTO tracking systems. Although this report collapses both Messenger-related and CSIR-related problems into a single bar labeled "APS," it appears that almost 300 "APS" problems were observed in August, 1994. However, the report also reveals the towering magnitude of PC-related problems. With the number of PTOnet hook-ups and PC usage within the examining corps undergoing a quantum leap during this period, PC-related APS problems would be expected to go up proportionately.

System response time varies, depending on the APS database and channel being used

Numerous commentators in the focus group and interview phase reported that APS was difficult to access -- and slow to respond -- at peak periods during the day and at certain times during the year. Some claimed that the situation deteriorated during the past year or two as the number of users and their level of usage has gone up.

Survey findings indicate that rating of "system response time" varies considerably, depending on whether one is talking about image retrieval (CSIR) or text search (Messenger); whether one is talking about "log on/connect time to initiate a search," "time to execute a search and go to first screen" or "time to go screen-to-screen"; and in the case of text search, whether the text search is done through a desktop PC, through a shared, single-screen text terminal, or through an image workstation. These ratings are summarized in the following "acceptance scores" (percent satisfied or neutral):

Research Tool	Response time to execute a search and go to first screen	Response time to go screen-to-screen	Log on/connect time to initiate a search
Text search through a desktop PC	71%	81%	81%
Text search through a single-screen, shared text terminal	57%	71%	74%
Text search through an Image workstation	43%	56%	39%
Image retrieval through an Image workstation	40%	49%	40%

In all cases, "response time to go screen-to-screen" is rated at least somewhat more favorably than "response time to execute a search and go to first screen." However, in the case of image retrieval through an image workstation, less than half the users are "satisfied" or "neutral" on any measure; log on/connect time received a particularly abysmal rating of thirty-nine percent (39%) -- the lowest of any response measure. In the case of text search through a desktop PC, approximately three-quarters of all users are "satisfied" or "neutral" on any measure -- this is the top-ranked channel in terms of system response time. Text search through a single-screen, shared text terminal ranks second and text search through an image workstation ranks third.

The best "hard" data available on APS response time is conveyed in a monthly "Information Systems Executive Report" produced by the Capacity Planning and Performance Management Division. A "Transaction Response Time for Search Applications" section of the report shows the monthly average response time for both Messenger search requests and CSIR page retrievals. Another exhibit titled "Messenger Search Requests and Response Times" shows Messenger response time superimposed on the number of Messenger search requests.¹⁴

The latter time series graphs show that the monthly number of Messenger requests from all sources -- examining corps, public users, and other -- has trended upward, from about 150,000 in October, 1991 to about 233,000 in August, 1994. (An all-time peak of 262,566 search requests was recorded in March, 1994.) What this means, of course, is that the actual work load *on the system* has increased over sixty percent (60%) during a twenty-month period -- a statistic that also underscores a dramatic growth in dependency on APS.

From October, 1991 to January, 1993, Messenger response time improved -- from 24 seconds to about 16 seconds -- largely due to installation of Amdahl 6390-2 storage devices in May, 1992. But from January, 1993 to the present (August, 1994), Messenger response time drifted back up (deteriorated) as usage continued to increase. As of August, 1994, response time was back to 24.2 seconds -- about the same level as it was at in October, 1991.

Other PTO exhibits state that PTO's Messenger response time target is for "at least 80% of all search requests to be completed in less than 30 seconds." In August, 1994, 69% of all requests were completed in under 10 seconds and 83% were completed in less than 30 seconds. In other words, Messenger response time was within target by only a small margin in August, 1994.

¹⁴See Appendix D for details.

In sum, "hard" data indicate that Messenger response time has been steadily deteriorating in recent months, and this situation will need to be remedied with appropriate hardware upgrades in the near future to avoid placing users in the "critical zone."

Examiners also raised concerns about general sluggishness of the image workstation

In the case of CSIR, PNAs (Page Not Available) and especially unpredictable slowdowns and delays (Request in Progress) are a continuing source of frustration to the corps ("like being stalled at a stoplight for five minutes or more").

As with the "stoplight" metaphor, occasional delays at the image workstation seem longer than they really are, because they are interrupting a work sequence and they are occurring in a "dark and drafty room," rather than at "the water cooler." While some examiners tend to focus on the "time lost" in using the image workstation, there is a tendency to overlook the time gained -- in the form of not having to walk to a search room (sometimes in another building), pull down the shoes, sort through the paper, and put the whole mess back in order. The image workstation provides further timesavings by enabling the user to create document collections comprising multiple class and subclass by automatically merging subclasses and eliminating duplicates. This enables users to review up to thirty percent fewer documents on the machine, as compared to paper.¹⁵

Internal reports indicate that the total number of image pages retrieved (from all sources -- examiners, public, and "other" users) has gone up even more dramatically, from less than four million in January, 1993 to over twelve million in August, 1994 -- a 300% increase in a twenty-month period.¹⁶ However, at the same time that aggregate demand on the system has gone up to that extent, average retrieval time per page, surprisingly, has actually **improved** -- from about .8 seconds in June, 1993 to .44 seconds as of August, 1994.

¹⁵A "more recent version" of the image workstation also has the welcome advantage of being much faster to log on. The older version sometimes required five minutes or more.

¹⁶Much of that 300% increase, in fact, did not come from the examining corps, but from the fact that a Public Image Search Facility was opened in July, 1993, providing public access to CSIR -- and a spurt to total CSIR usage. (As of September, 1994, examiners accounted for about sixty percent (60%) of all image pages retrieved.) The point to be made, however, is that response time experienced by the examiners is impacted by usage from **all sources**; total usage from all sources is shooting up, yet response time is paradoxically improving.

PTO management documents further state that PTO's CSIR target is "for the retrieval of each page to be completed in less than one second." While the average retrieval time reached a peak of 1.02 seconds in February, 1992, performance has been well ahead of target since that month, and supposedly has been getting better up to the present time (August, 1994).¹⁷

"System recoverability" seems to vary a great deal, depending on the APS channel being used

Survey findings confirmed that system recoverability -- the ability to save work following a system crash, lock-up or boot-off -- is judged **best** with text search through a desktop PC (69% acceptance); **next best** with text search through a shared, single-screen terminal (63% acceptance); **third best** with text search through an image workstation (45% acceptance); and **worst** with image retrieval through an image workstation (44% acceptance).

This accords with the focus group finding that image retrieval through an image workstation (at least in its recent form) is particularly lacking in automatic backup-and-save features, while text search through a desktop PC seems to provide maximum safeguards -- some of them resident in the desktop PC itself.¹⁸

¹⁷While the latter "hard" data indicate that CSIR retrieval time is presently excellent -- and has been getting better throughout the past three years -- focus group and survey results strongly suggest otherwise. Pending further investigation, we suspect the "hard" data may be understating the actual delay experienced by users at the image workstation at certain times and in certain conditions. This might be an appropriate topic of investigation for SIR, including comprehensive on-site measurement of CSIR retrieval times under a variety of times and conditions.

¹⁸This is only one of several instances where the desktop PC -- particularly the operating system and the graphical user interface -- can provide flexibility, convenience, and customization features that are sometimes lacking in the more standardized "shared facility" channels.

PTOnet's reliability is judged to be acceptable at present and its capacity adequate to handle foreseeable needs

The monthly "Information Systems Executive Report" also provides PTO's senior management with the best available "hard" data regarding PTOnet's reliability. One section titled "PTOnet Outages" shows the number of "segments," "applications," and related network "devices" down during that month; "possible number of users affected"; and "possible user hours lost." A recent report for August, 1994 shows that there were 25 instances of network devices down during that month, accounting for 1,725 possible users affected¹⁹ and 3,597.75 possible user hours lost.²⁰ (Some of those lost hours were attributable to Trademark and other divisions of PTO.)

While there are no performance targets currently in effect for PTOnet -- as with Messenger availability, CSIR availability, and workstation availability -- PTO managers who were interviewed about PTOnet performance believe the figures described above are quite respectable in view of the fact that there are 101 network segments currently in use and a total of about 3,900 "customers" on the network. Their reading of current Help Desk calls is that user problems tend to be related to the platforms and occasional file server outages, rather than to network availability or reliability.

These managers also believe PTOnet's reliability has been improving over the past year or two, as the needs of various divisions and usergroups have become better understood and balanced out with appropriate network configurations. However, if we take the figures described above at face value, there are still enough network outages each month to "burn" at least a few examiners and to lose a significant amount of user-hours.

On October 21, 1994, PRC submitted the final version of a Systems Analysis Report (SAR) on PTO's network needs through the year 2000. The report projects an increase in aggregate throughput from 26.59 Megabits per second in 1994 to 352.82 Megabits per second in 2000, and discusses in detail the migration plan needed to meet future demand. This report appears to be as thorough as that kind of forecasting document can be, and gives reason to believe that PTO can stay ahead of the curve by continuing to invest in its network in a steady and intelligent manner in coming months.

¹⁹There is some double counting in this figure.

²⁰These data are included in Appendix D.

In sum, well-informed PTO commentators believe that PTOnet is not a "choke-point" in the present APS, and the network is adequate to handle "foreseeable" needs in the near future. Nevertheless, one senses an element of unpredictability as hundreds of examiners are scheduled to be hooked up to PTOnet in the closing weeks of 1994; the entire examining corps converts to a desktop environment (text and image) within the next few years; and many new office automation tools come on line. PTO must pay close attention to emerging demands on its network and continue to develop that infrastructure in a steady way.

Chapter 6: TRAINING

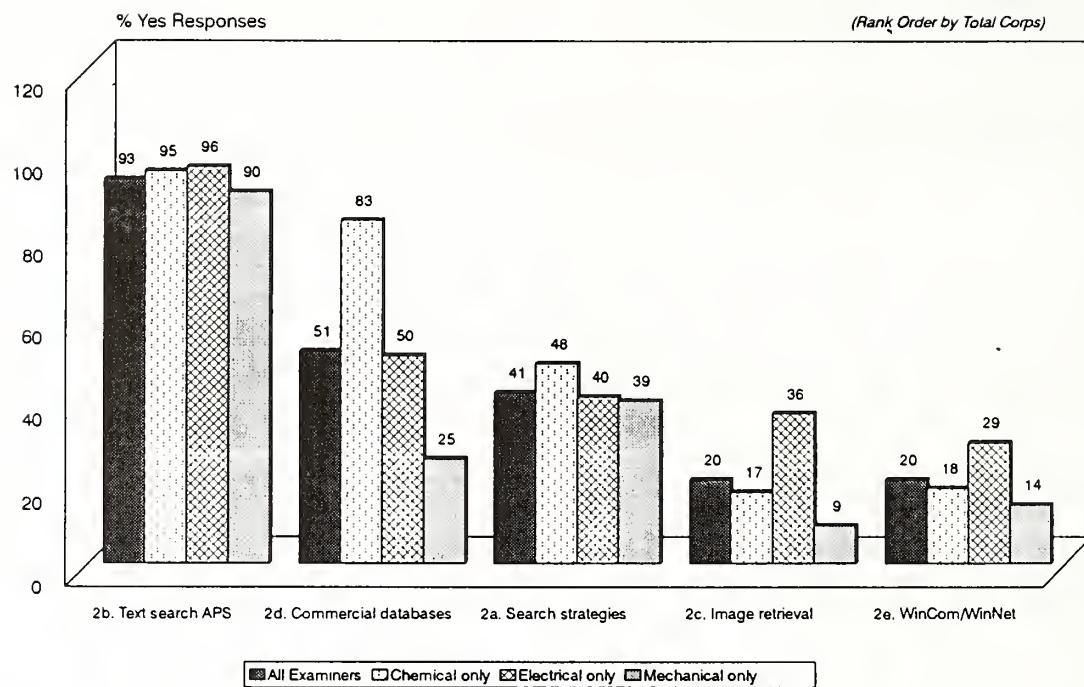
Examiners lack fundamental skills to fully utilize the information resources available to them at PTO

One unmistakable theme emerging from the focus group discussions was the need for better training about how to use the myriad of APS-related research tools. Examiners provided anecdotal examples and high praise for the original training they received on the system, but almost everyone said they needed on-going and refresher courses to fully utilize all the system features available to them. Overall, focus group commentators reported a pervasive void concerning information about how to operate the system (documentation), how to solve common problems within their work area, and who within the CIO organization had responsibility for different aspects of the system. Focus group participants often got sidetracked trading information on how to "get" APS to perform some function, or confessed to one another, "Gee, I never knew the system could do that!"

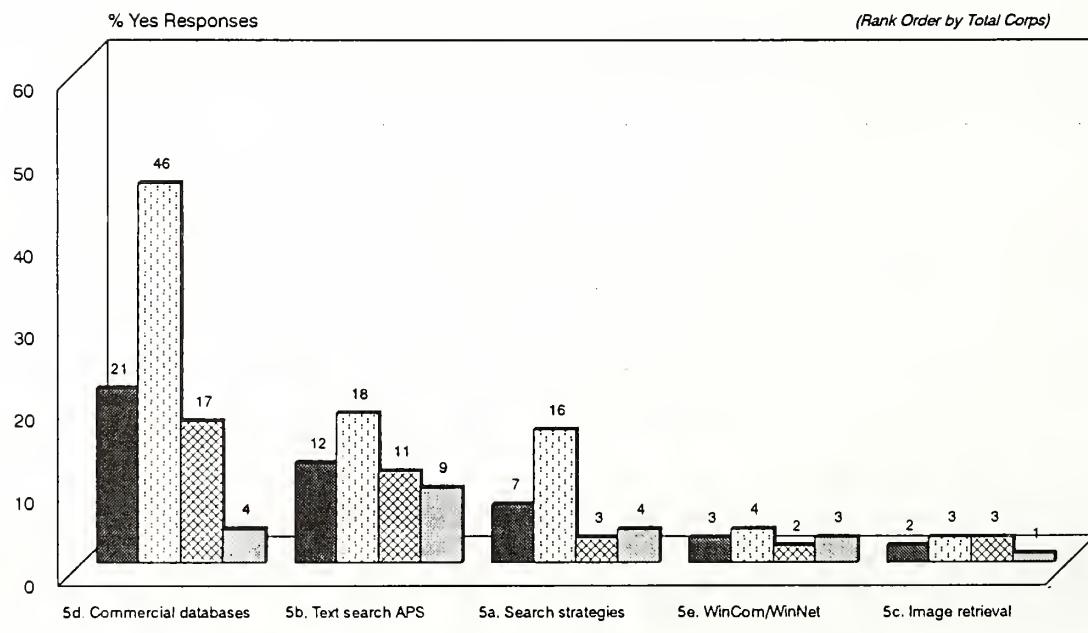
The extent to which PTO's current training processes¹ have failed to meet the most basic needs of examiners is borne out in the startling finding that almost half (46%) of the examining corps are dissatisfied with their own skills at using available information resources. The majority of examiners received initial training on APS Text Search, yet less than half of the corps can actually remember and utilize most of what they learned in the initial session. And although examiners rated advanced and refresher training as one of PTO's top three priorities, only a small fraction of the corps has ever been offered such training. As the focus group commentators revealed, most examiners have only a basic familiarity with APS and related search tools and very little opportunity to learn more of what they need to know to do their job effectively and efficiently.

¹PRC, Inc. was responsible for Text and Image training in the period July, 1990 to July, 1993, at which time the PTO's Patent Academy took over this training. According to the APS Text and Image Training Metrics prepared by PRC, the average overall scores for all PRC-delivered training classes fell in the "excellent" category (between 17 and 20 on a 1-20 scale).

INITIAL TRAINING



REFRESHER TRAINING



While initial training may be adequate (see the chart on the previous page), much of what is learned is lost over time. Examiners are not provided with regular opportunities to update their skills. New software applications become essentially useless because examiners often do not know that they are available, let alone how to use them. Training sessions are not geared towards meeting specific art group needs. And there is a tremendous lack of user-friendly reference materials that explain how to get these search tools to do what examiners need them to do. PTO needs to redirect some resources into this apparently weak link in its overall operational strategy.

Examiners are not being adequately trained on APS and related search tools

In order to fully document the level of training at PTO, examiners were asked a series of questions relating to the initial and refresher or update training they received on the following: search strategies and methods in their art area; text search on APS; image retrieval on an image workstation; commercial databases; WinCom/WinNet; or other search tools that have been made available to them at PTO. To a great extent, their responses comported with our focus group conclusions -- while examiners are relatively satisfied with the initial training they received on these tools, on-going refresher and update training is sorely needed in order for them to fully utilize all of the available search tools.

Despite the generally high level of satisfaction with initial training, the survey findings reveal that its value is diminished because a majority of examiners simply do not remember what they learned in these sessions. More importantly, they are rarely provided with opportunities to update or advance their skills. For example, most examiners -- some ninety-three percent (93%) of the examining corps -- received initial training on APS Text Search. Of these, eighty-five percent (85%) rated that training as adequate -- the highest score received by any training program. Yet less than half (46%) of those who received initial training on Text Search remember and utilize what they were taught and less than one-fifth (12%) have received refresher or update training on this essential search tool.

Examiners reported similar training experiences with other search tools. Only twenty percent (20%) -- or ninety-one percent (91%) of the twenty-two (22%) of the total examining corps who currently have access to image search -- received initial training on image retrieval on an image workstation. Of that twenty percent (20%), almost three-quarters (72%) rated the initial training as adequate and just over half (55%) still remember what they learned. A paltry two percent (2%) of examiners with access to image search have received refresher or update training. These results indicate that there are some 2% of examiners who currently have access to image search that have never received training on this critical search tool.

One of the most dramatic findings is that some three-fifths (59%) of the examining corps has never received initial training on search strategies and methods for their specific art area. This is a particularly disturbing finding given the fact that examiners have strikingly different needs for electronic tools. The APS Text and Image Search systems have been developed as generic search tools and examiners have, for the most part, been provided with generic training sessions. Examiners do not, however, have generic searching techniques. The 154 art groups -- the subgroups of PTO's 16 chemical, electrical and mechanical examining groups -- have very different needs, in terms of search strategies, work methods and the search tools that must be applied in the examination of each patent application.

The survey revealed that examiners are very dissatisfied with the extent to which APS is customized to art group needs. This measurement received the fourth lowest score in a section which rated satisfaction and importance of various aspects of PTO's information resources. Moreover, two-thirds (65%) of the examining corps said that advanced/refresher training on new APS features, "tailored to the way search is conducted in each of their specific art areas" would have a significant impact on their job performance. This latter item was rated as the second top priority in a list of fifty-five potential enhancements to the Automated Patent System.

Of the two-fifths (41%) of examiners who did receive initial training on art group specific search strategies and methods, less than three quarters (71%), rated the session as adequate. Less than half (46%), still remember some or most of what they learned in that initial session. Refresher or update training on art-specific search strategies and methods was provided to only seven percent (7%) of the corps, of which sixty-two percent (62%) rated this session as adequate.

As with image retrieval, only a small subset of the total examining corps is currently able to access the commercial databases which are made available to examiners in the following locations: through the shared use text terminals and the image workstations; at desktop PCs; at special terminals throughout the offices which house examiners; and, at the Scientific and Technical Information Center (STIC). According to this study, less than half (46%) of the total examining corps reports they have access to one or more commercial databases. Yet just over half (51%) indicate they received initial training on one or more commercial databases. This discrepancy could be explained by the fact that examiners must have an account number to access a commercial database. It is possible that some examiners were never given an account number to actually use the commercial database for which they received training.

Next to APS Text Search, initial training on commercial databases received the second highest score for training adequacy -- seventy-two percent (72%) who received it were satisfied with their initial training session. Commercial databases also received the highest scores in the refresher/update training category. Of the one-fifth (21%) of examiners who received refresher/update training on commercial databases, over three-quarters (76%) were satisfied with that training. On the other hand, commercial databases received the lowest score -- twenty-four percent (24%) -- for the number of examiners who remember what they learned in their initial training session.

Although almost the entire examining corps (93%) has a PC at their desk, just over one-tenth (14%) are currently using WinCom. Forty-six percent (46%) use WinNet, sixteen (16%) don't use either, and almost one-quarter of the corps (24%), are not sure if they are using WinCom or WinNet on their desktop PC. In addition, only one-fifth (20%) of the examining corps has received initial training on either WinCom or WinNet. Less than two-thirds (62%) -- the lowest score in this category -- who received this initial training rated it as adequate. Surprisingly only forty-five percent (45%) remember what they learned, despite the fact that this training would have taken place within the last year. Not surprisingly, only three percent (3%) have received refresher/update training on WinCom/WinNet; only two-fifths (40%) of those who did receive it, rated it as adequate.

A final search tool category, "other," yielded some interesting results. Some one-fifth (19%) of the examining corps received initial training on other automated tools and applications, such as the Internet, Action Writer and PCs. Three-quarters (73%) of those who received initial training on these other applications rated this training as adequate; yet, only two-fifths (40%) still remember most of what they learned during this session. Of the three percent (3%) of examiners who received refresher or update training on these other search tools, some three-fifths (61%) were satisfied with this session.

Examiners were asked to rate the adequacy of documentation and reference materials they have received in each of the following areas: search strategies and methods in their art area; text search on APS; image retrieval on an image workstation; commercial databases; WinCom/WinNet; or other search tools that have been made available to them at PTO. Focus group commentators reported a pervasive void concerning documentation about how to operate APS and supporting systems. The APS manual was declared impenetrable, the irregular APS tips in the PTO Newsletter hard to follow, and the overall documentation on new features and enhancements virtually non-existent.

Statistical findings support the focus group observations about documentation -- one-third to two-thirds of the examining corps find their documentation and reference materials to be inadequate, depending on the area in question. Examiners are most satisfied with documentation on APS Text Search: over two-thirds (68%) of the corps rating it as very or generally adequate. Commercial databases rated second at sixty-one percent (61%) and other automated tools rated fifty-nine percent (59%). Approximately fifty-five percent (55%) of the examining corps is satisfied with documentation and reference materials received for image retrieval on the image workstations. At the bottom of the documentation satisfaction rung are search strategies and methods for art areas and WinCom/WinNet, both at forty-two percent (42%).

Overall, patent examiners express serious misgivings about their ability to fully utilize the information resources available to them at PTO. When asked to rate the extent to which they are satisfied that they have the training and skills to effectively and efficiently use all the available information resources, about half (46%) of examiners stated that they are dissatisfied. Examiners clearly want and need more and better training on all of the automated systems and tools that they use to do their job.

Examiners are most satisfied with APS Text Search training and documentation

Of all of the search tools available to examiners, PTO has done the best job of preparing the corps to access and manipulate APS Text Search. Examiners gave Text Search on APS the highest score in the following categories:

- Percentage of the corps who received initial training (93%)
- Percentage of the corps who rated the initial training as adequate (85%)
- Percentage of the corps who rated documentation as adequate (68%)

Text Search on APS rated the second highest in two other categories:

- Percentage of the corps who received refresher/update training (12%)
- Percentage of the corps who rated the refresher training as adequate (65%)

These positive ratings for APS Text Search are probably related to the fact that all examiners have access to it -- either from a shared text terminal, an image workstation or from a desktop PC -- and most examiners use it on at least some applications.

Regular use of search tools reinforces training

The focus group findings and statistical data demonstrate the linkage between the extent to which examiners remember what they learned during their initial training and the extent to which they use the various search tools on a regular basis. While only a small percentage of the corps -- twenty-two percent (22%) -- currently has access to image retrieval, these examiners have the highest recall rating from their initial training -- over half (55%) remember most of what they learned. Our findings show that examiners with image retrieval access tend to be committed to this system and to use it on a fairly regular basis. Sixty-three percent (63%) of them say that they use it nearly every day or at least one or more times a week. Over three-quarters (78%) feel that image retrieval largely fulfills the information needs of their job -- the second highest rating for all of PTO's automated search tools.

At the other extreme, of the fifty-one percent (51%) of the examining corps who were trained to use one or more commercial databases, only one-quarter (24%) remember what they learned in their initial training session. While the need is growing for examiners to search the non-patent technical literature available through commercial databases, there is currently only a small percentage of examiners who use this search tool on a regular basis. Over half (54%) of the corps do not currently have access to any commercial databases. Of those who do have access, only seven percent (7%) use commercial databases at a special center or a shared facility workspace on a regular basis. Sixteen percent (16%) use commercial databases through their desktop PC on a regular basis.

The survey data clearly shows that examiners want more and better access to commercial databases. Almost three-fifths (59%) of those examiners who do not currently have access to commercial databases would like to be able to use them, and over one-third (36%) of these examiners think they would use these search tools at least one or more times per week. Moreover, the ability to access all commercial databases at the desktop was rated as one of PTO's top fifteen priorities in a list of fifty-five potential system enhancements. PTO must find a way to better prepare examiners to make full use of these increasingly vital search tools.

Refresher/update training is inadequate by any standard

Examiners across the board are extremely dissatisfied with the state of refresher or update training they received -- or failed to receive -- at PTO. Focus group commentators appeared dumbfounded when asked what they thought about their refresher and update training sessions and the study results illustrate why. Very few of them have received any training, of any kind, beyond their initial training. Only twelve percent (12%) of the examining corps has participated in refresher/update training for Text Search on APS. An even smaller percentage (7%) has participated in refresher/update training for search strategies and methods for their art area. Only a handful (3%) of the corps has received refresher/update training for WinCom/WinNet. Of those examiners who have access to image retrieval -- arguably the most complex of APS's subsystems -- only two percent (2%) have participated in refresher/update training for image retrieval on an image workstation. And only one fifth (21%) of those who have access to a commercial database have participated in refresher/update training for this search tool.

Moreover, refresher/update training, infrequent and tardy as it is, is significantly inadequate when compared to initial training. For example, under two-thirds (65%) of the examiners who participated in refresher training on APS Text Search rated this session as adequate, as compared to eighty-five percent (85%) who rated their initial training as adequate. Over three-fifths (62%) rated update training for art-specific search strategies and methods as adequate; just under three-quarters (71%) rated their initial training for this search tool as adequate. WinCom/WinNet received the lowest rating in the satisfaction with update training category -- two-fifths (40%) rated it as adequate. Over three-fifths (62%) rated their WinCom/WinNet initial training as adequate. Only one search tool -- commercial databases -- received a higher rating for update training (76%) over initial training (72%).

Chapter 7: COMMUNICATION, MANAGEMENT AND SUPPORT ISSUES

Communication channels between examiners and the managers and divisions of PTO which support APS impact success

Commentators in the focus group sessions described an environment at PTO in which effective channels of communication are either non-existent or practically useless. Examiners do not know where to address their complaints or suggestions for improvements within PTO management and most tended to be pessimistic in their view that nothing would ever happen even if they were to make constructive suggestions. There are few opportunities for examiners to exchange information, whether it be technical developments in a given art or tips on how to get APS to do something or apply advanced search techniques. Written documentation on system changes and enhancements is not only untimely, but also poorly delivered and organized. The survey findings confirm conclusions drawn from the focus group sessions that PTO must make improved communication one of its top priorities.

Past communication channels have not been effective

Examiners who participated in the focus group sessions were virtually unanimous in their belief that there are currently few effective channels for communicating suggestions for systems related improvements to the managers who are making the important decisions about what APS will look like in five years. Few examiners are aware of the user group representative concept and those who do doubt that these representatives can really affect change. Moreover, examiners tend to feel that even when they do make suggestions, they never receive feedback on their input.

Some of the more senior examiners who participated in the focus groups opined that this lack of communication was the result of deliberate management philosophy that caused system development and management to be partitioned off from the view of most managers as well as of front-line employees. During the handful of group meetings with middle managers, someone almost invariably (and quite spontaneously) claimed that one recent regime of information resource managers had applied authoritarian approaches to system development and intentionally excluded other organizations from influencing decision-making during a several year long epoch.¹

When asked to rate their satisfaction with and the importance of some twenty-one aspects of APS, examiners indicated that one of the greatest areas of disappointment is communication -- or the lack there of. Along with refresher/update training (51% satisfied), the availability of a channel for submitting systems-related suggestions for improvements to APS rated the lowest in terms of satisfaction (53% satisfied). Just over half (56%) are satisfied with the feedback they receive on suggestions they have submitted about problems regarding APS.

Examiners are also not satisfied with PTO's track record in preparing examiners for system changes and enhancements -- both in terms of training and documentation. Focus group commentators complained of system changes being made to their desktop PC without any warning or the provision of related documentation. It was not surprising to find that examiners are not satisfied with the reliability of information about system changes and enhancements scheduled for implementation (only 64% were satisfied).

Two-thirds (66%) of the examining corps are satisfied with the opportunities they have for swapping information among colleagues about search methods and techniques.

¹A number of re-alignments and reorganizations of the information resource management organization and operations has occurred in the past year. These changes are believed by many well-informed commentators to reflect needed reforms to introduce better communication and cooperation.

Communication about needed system requirements travels along a convoluted path between examiners and those who bear ultimate responsibility for responding to their needs.

The voices of the various examining groups are transmitted through a series of organizational trumpets with various roles in telling the examiner's story -- including individual group leaders, their union leadership, the SIR organization and the CIO community -- before their requirements are conveyed finally to senior management and on to the vendor(s). Along this convoluted path, many translators intervene -- often with conflicting interests -- before matters can be negotiated and resolved.

Before any final task order can be handed off to vendors, a certain erosion of clarity is almost inevitable in the current management process. One useful organizational model that has been employed successfully in the private sector assembles customer-oriented teams to focus on meeting end-user evolving needs. Such teams are constantly reviewing ways to adopt the best technology to address emerging business requirements, re-defining applications as technology shifts and providing all the technical support a customer needs to utilize the very best technology available at the best price. While there are some aspects of these strategies currently available in the function of SIR, more direct communication between the primary system users and the system developers could go a long way to alleviate some user resistance and more efficient use of APS.

Anecdotal and statistical data present conflicting information about the Help Desk

Focus group commentators were quick to claim that the Government Client Support Help Line (the "Help Desk") is not very helpful. They attributed the situation to a number of factors: personnel who staff the Help Desk are not as "technically astute" as they should be; they are expected to be experts on a variety of systems in addition to APS; they do not understand the larger automation context within which APS works; and they have to hand off certain problems to CIO's Technical Control Facility (TCF), where additional delays in problem resolution may occur.

However, when examiners were asked to rate their satisfaction on a list of twenty-one IRM-related issues, fully eighty-two percent (82%) of all respondents described themselves as "satisfied" or "neutral" on the issue of the "effectiveness of the Help Desk (305-9000) in resolving equipment problems or system problems (they) encounter in the course of doing (their) job." Less than one-fifth (18%) were dissatisfied -- ranking this item near the top of all twenty-one items.²

On the other hand, the survey reveals strong dissatisfaction concerning "availability of someone who can help get you through some of the more difficult or obscure situations that sometimes arise with APS (only 64% were satisfied or neutral; 36% were dissatisfied). Apparently patent examiners do not make the connection that the Help Desk might be expected to perform the latter function.

The Information Systems Executive Report (September, 1994), particularly the page titled "Problem Management System report," sheds some light on the Help Desk performance:

- The total number of APS problems in September, 1994 was about 300.
- Approximately 90% of those 300 APS problems were resolved within 0-3 days; the average resolution time was five days.
- The "PC" category towers over all other categories, with over 800 problem records noted. This is partly explainable by the fact that the "PC" category is independent of any application category, and includes such items as requests for PC software upgrades, installations, and moves. With PTO's impending shift to a desktop environment, this large category is certain to become even larger.
- A PC Support Help Desk (308-6936), provided by contractor GMSI, handles all PC-related problems, questions and requests from all areas of PTO. Some six persons respond to an average call volume of fifty calls per day (as of early November, 1994).

²While not wishing to detract from this positive and somewhat surprising result, we should point out that this question was asked of all examiners, with no further qualification regarding the respondent's amount of experience (or recency of experience) with the Help Desk. (We will, however, be able to see if this result holds up as well with respondents who identify themselves as relatively heavy users of APS.)

Until we have more in-depth analysis on the issue, it appears that the Help Desk is not a major source of dissatisfaction to the examining corps as a whole.

- The regular USPTO Help Desk (305-9000)-- staffed by about thirteen PTO employees -- handles problems related to specific applications, such as APS devices -- workstations, group printers, etc -- and the respective platforms. Call volume to this group is currently averaging about forty calls per day.

PTO management envisions a Help Desk configuration for PTO that would be mostly decentralized, with dedicated, on-site personnel assigned to at least four locations: Office of Trademarks, Office of Patents, Associate Commissioner, and OCTO/CIO. Support on weekends and holidays might be furnished from a single, centralized location.

As this study approached its conclusion, a dedicated on-site Help Desk had been recently installed at the Office of Trademarks, and plans were underway to introduce a similar arrangement for Patents. Such a decentralized arrangement should lead to improved service to the user groups, and improved feedback from the user groups to the people responsible for providing production facilities.

Chapter 8: FUTURE NEEDS ASSESSMENT

APS is a living system and both expectations and requirements shift as new technology emerges

During the interview phase, many commentators seemed caught in a dilemma. On the one hand, they praised APS as the best of all possible worlds, but often in the next breath they cursed it because it could not help them accomplish even more. Overall, examiners have come to take APS's features for granted and in the process have continued to heighten their expectations about what the system can and cannot do. One examiner put it this way:

If I had to do without APS, it would be like asking me to give up electricity when my complaints are only that I need a halogen lamp instead of a 60° watt bulb. If we complain, it is because we need more -- not less.

During one discussion about whether APS was able to stay abreast of current technology and remain responsive to examiners' emerging needs, another commentator made this observation:

"We ought not pillory the pioneers for trying. When we started out ten years ago, no one had ever made this journey. PTO was trying to do something that had never been done before. The technology was back at the abacus stage and PTO forged ahead, based on the best knowledge of what was available at the time. But now we are behind and need to accelerate in order to get out ahead of the curve again. This is just part of the evolutionary cycle."

Another examiner -- among the few who claimed to be a real computer expert -- made this comment:

"By the standards of the mid-1990s, APS is a very cumbersome, unforgiving, sharp-edged, hard-to-learn, hard-to-remember, non-user-friendly system. When I think about the overall structure of commands in APS and its Boolean logic terms for specifying search parameters, the word that keeps coming to mind is 'arcane.' But this is a hills and valleys business and we will probably always be either behind or ahead. In the meanwhile -- probably most of the time -- we are in the mainstream of development and we keep relying on APS to do the business of both yesterday and tomorrow."

APS flexibility to respond to individual group needs should be a priority

There is no question that one disappointing -- although perhaps unavoidable -- outcome of APS's original architectural strategy is its relative inflexibility in responding to the full range of often unique requirements within individual art units. As one examiner put it, "APS is a generic searching tool" and "examiners don't have generic searching techniques." Other commentators on this subject had this to say:

"APS was designed to mimic what we **thought** to be the standard mode of paper search then in effect throughout the examining corps. In fact, that 'standard mode' turned out to have more local variations than anyone realized."

"APS is a one-size-fits-all kimono. There is much need to customize it -- in a more user-friendly, menu-driven way -- to the unique needs and methods of each art area."

The survey results indicate that nearly half (43%) are dissatisfied with the extent to which APS has been customized to meet the individual needs of the examining groups.

Focus group discussions provided the basis for creating the list of most requested features

Each examining group to participate in the interviews generated its own "wish list" of feature enhancements they wanted or needed. While some had idiosyncratic application to only one or two sub-groups, most requests traversed the boundaries of examining and art groups. By the time the interview phase had ended, a basic list of fifty-five items emerged as the features most requested across the examining community.

The examiners' "wish list" was transformed into the Future Needs Assessment section of the survey. Respondents were asked to indicate what impact they believed a given feature would have on their overall productivity if it were available, using the following scale:

Major Impact
High Impact
Some Impact
Little Impact

In analyzing and reporting data from this section, the top two "high impact" categories were bundled, as were the lower two having lesser impact.

The table which follows reports -- in rank descending order of perceived positive impact -- the fifty-five future features rated by examiners. The table also reports the current status of PTO efforts to respond to these needs.

One cautionary note is in order. The table reports the priorities of the entire examining corps. Because of the unique requirements of the examining groups, the rank descending order is different with each separate community. For instance, the "ability to search on a chemical structure" is near the bottom of the generic list -- 51 out of 55. Yet, over sixty-one percent (61%) of chemical group respondents believe that such a feature will have major impact on their productivity. Follow-on analyses of each group will be needed to establish group-specific priorities.

QUESTION 34a - 34ccc

34. What positive impact would the following features have on your ability to perform your job more effectively?
(Future Enhancement)

		Status of PTO Activities to Implement Changes (Future Impact)	% of Total Examiners Who said Changes will have High Impact
u. Image and text on my desktop PC, with the ability to easily switch back and forth	1	PTO's strategic plan calls for a project to begin in 1996 that will extend desk top CSIR capability to all examiners. The project will continue over the three year period 1996-99.	78.00
ti. Advanced/refresher training on new APS features, tailored to the way search is conducted in my area	2	The Patent Academy is not currently funded to meet this need.	65.00
m. A thesaurus/registry feature that would automatically pull up all similar terms and spellings within any art area	3	Clearly a high priority item, this requirement was a complete surprise to those within PTO responsible for building the system - a fact that validates examiners reports of not always having their voices heard in APS planning discussions.	65.00
x. More consistent commands across all databases used at PTO	4	The Global Patients Initiative (GPI) will introduce an integrated system and will bring standard GUI to all databases (FY1995-2000)	63.00
v. Automatic log-in, where I can access a variety of databases in one session without having to log on and off	5	This expectation is not likely to be met at any time in the foreseeable future, given the fact that the industry has not moved in this direction.	59.00
i. An APS search routine that will initiate my search inquiry within my "narrowed" specification (class and sub-class, rather than searching through all patents all over again	6	A major software change to Text Search 2.0 (replacing Messenger) will be required to implement this change. Currently, such a change is scheduled in FY2000.	59.00
c. Access to patent material prior to 1971 (text)	7	PTO has no plans to implement because of cost prohibitions.	59.00
q. Ability to access foreign art on the image workstation	8	GPI project (1995-2000) will deliver this capacity.	58.00
o. Ability to search a single European patient database electronically	9	Global Patient Initiative (GPI) will introduce this capability and the first page portion will be implemented in FY1996. Examiners will have available to them a full array of foreign patients search tools, including technology classifications, indices, thesauri and concordances.	58.00
aa. More functional integration between the text screen and the image screen (e.g., highlight on a portion of text and call up associated images, or mouse to a figure in image and call up associated text)	10	If PTO decides to embrace Standard Generalized Markup Language (SGML), users will be able to customize search, retrieval and viewing procedures to their own specific needs. Within the next few years patent offices worldwide will convert their patent publishing operations to SGML and issue interchangeable patents using a standardized tagging format.	58.00
v. Ability to access all commercial databases only desktop PC	11	Virtually all examiners have PCs on their desk. PTO will need to expand access to commercial databases to meet this need.	57.00

QUESTION 34a - 34ccc

**34. What positive impact would the following features have on your ability to perform your job more effectively?
(Future Enhancement)**

	Status of PTO Activities to Implement Changes (Future Enhancement)	% of Total Examiners Who said Changes will have High Impact
m. Ability to create and store a personal digest of relevant documents (e.g., journal articles, foreign patents, etc.)	12	<i>This is a central goal of the Non-Patent Literature (NPL) project FY1999. It will provide examiners with access to external data bases and incorporate literature accompanying a patent application.</i>
r. An electronic lexicon, to cross-reference foreign terms and their English equivalents	13	<i>The Global Patent Initiative (1995-2000) will provide this capability.</i>
oo. A "break" key that promptly stops the processing when I hit it	14	<i>New releases of software which are part of the desktop deployment project will respond to this requirement. Also, some of these capabilities will be part of the new SUS features, which include standard Windows-type "escapes."</i>
ss. Better maintenance at the walk-up printers (paper, toner, clearing of jams)	15	<i>Contractor on-site Monday through Friday for equipment check-out and maintenance. Two hour on-call turnaround time on weekends.</i>
yy. Simpler, more user-friendly commands tailored to the way search is commonly conducted in my group	16	<i>PTO has no plans to implement this feature.</i>
vv. More practice time to learn APS features	17	<i>This is a training and communication issue which management needs to address.</i>
s. Ability to cross-reference foreign and US classification systems	18	<i>The GPI project (1995-2000) will deliver this capability to the desktop.</i>
k. Faster response time at my desktop PC (text only)	19	<i>By the beginning of 1996, distribution of commercially available CSIR workstations to all examiners will begin and PC-driven responsivity rates should improve</i>
uu. An on-line tutorial, to acquaint me with the latest feature	20	<i>Although this need has been discussed, there are no plans currently underway to develop it.</i>
qq. A help line that delivers well-informed and timely help	21	<i>A recent reorganization in PTO creates a process whereby help units will be geographically decentralized and housed in closer proximity to those who need it.</i>
d. Access to electronic image search and retrieval (on image workstation)	22	<i>By the end of 1994, PTO will install 48 new shared use image workstations as the SUS or shared use project. (Anyone can use the image workstations, they are just more conveniently located to four groups whose examiners have been trained to use the CSIR system.)</i>

QUESTION 34a - 34ccc

34. What positive impact would the following features have on your ability to perform your job more effectively?
(Future Enhancement)

	Status of PTO Activities to Implement Changes	% of Total Examiners Who said Changes will have High Impact
g. Fewer system crashes and lock-ups, fewer times kicked off the network	<i>PTO's automation infrastructure is scheduled to be improved through two primary projects -- PTO Network Integration Project and the GIS II Project (RADS/HDDS, asynchronous connection, Sept 95)</i>	47.00
ii. Better maintenance of hardware in the shared use/cluster workstations (CRTs, terminal, printers)	<i>Contractor on-site Monday through Friday for equipment check-out and maintenance. Two hour on-call turnaround time on weekends.</i>	45.00
i. Faster response time at an image workstation (text and image)	<i>According to internal PTO measurements (10 seconds response time and 1 second flip rate), the requirements are already being met. Examiner's expectations simply exceed the capabilities of the equipment.</i>	44.00
p. Ability to search Canadian patents electronically	<i>PTO has no current plans to include this capability as a unique function; both GPI and SMGL will greatly expand the capability to search non-US patents.</i>	43.00
mm. Ability to conduct large scale searches without exceeding system capacity	<i>The infrastructure projects scheduled to begin in 1995 will address this need. (PTO Network Integration Project and GIS II.)</i>	
dd. Ability to have the search terms highlighted on the print-out copy of the patent	<i>Current limitations are tied to Messenger system restrictions. When this software is replaced, this function will be added.</i>	43.00
pp. A "help" function key that suggests possible solutions to the problem, then returns me to the prompt	<i>SUS will provide a context-sensitive HELP capability. Desktop deployment project will introduce a full component of such user-friendly tools.</i>	42.00
ccc. E-mail to facilitate internal communication and transfer of documents	<i>Once PTONet is fully deployed, all examiners will have E-mail capabilities.</i>	41.00
bb. Ability to scroll up and down on the image workstation, rather than just zoom in and out	<i>With the new SUS, examiners can flip back and forth between pages, but can't really scroll because of limitations associated with parameters of fixed image retrieval.</i>	40.00
ww. More opportunity to swap ideas among examiners on how to conduct search	<i>Management will need to create an appropriate forum for such exchanges.</i>	38.00
z. More mouse-driven convenience functions (as in WordPerfect)	<i>The new 48 SUS have Windows interfaces as will PCs in desktop deployment project.</i>	37.00

QUESTION 34a - 34ccc

34. What positive impact would the following features have on your ability to perform your job more effectively?

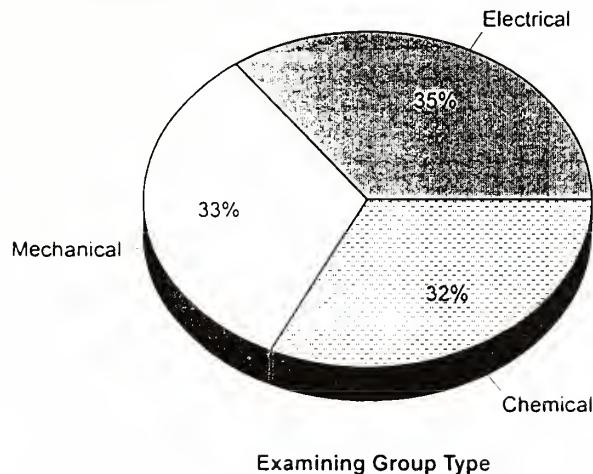
(Future Enhancement)

		<i>Status of PTO Activities to Implement Changes</i>	<i>% of Total Examiners Who said Changes will have High Impact</i>
xx. A more clearly defined pipeline for communications--and getting feedback on-- suggestions for improving APS	34	New and emerging management reorganization will focus on ways to better introduce examiners ideas on how to improve APS.	37.00
nn. Indication of the number of pages that will be printed out before I hit "print" key	35	The desktop deployment project will deliver this function	37.00
cc. Ability to access interference prints on the image workstation	36	To be incorporated into PAM.	37.00
kk. Alternative search modalities, such as target search (like Dialog); freestyle search (like Lexis); or fuzzy logic	37	To be incorporated into Text Search replacement.	36.00
bbb. Notation of where hits come from, in the case of merged sub-classes	38	PTO has no current plans to implement this function.	36.00
gg. Ability to search on the oldest effective priority date	39	The Messenger replacement project will introduce this function	35.00
ff. Connection of my PC to the PTO network by modem or PTO Net (text only)	40	All examiners are scheduled for hook up to PTOnet by 12/31/94. Over the next 18 months the infrastructure will require adjustments before PTOnet can function at its full capacity and maintain consistently high performance standards.	35.00
j. Faster response time at the shared, single screen text terminals (text only)	41	With desktop connection to PTOnet, text terminals will all be phased out.	34.00
hh. Faster log-in on the image workstation	42	Log-in time should be substantially improved with the new 48 SUS. The desktop deployment project (FY 1996-FY 2000) should alleviate most perceived delays.	33.00
ee. A more convenient (or automatic) back-up-and-save feature	43	There are no new save features on SUS. This goal is difficult to achieve in a distributive system because work is not self-contained in an examiner's workstation. (Any "save" function would be in the server and the client station's comments to save would get lost with the traffic.)	33.00
yy. The ability to place notes on electronic files	44	This capacity will be implemented with PAM project, FY2000 (The requirement has existed for some time, but revenues have never been available to implement.)	32.00

QUESTION 34a - 34ccc	Status of PTO Activities to Implement Changes (Future Enhancement)	% of Total Examiners Who said Changes will have High Impact
34. What positive impact would the following features have on your ability to perform your job more effectively? <i>(Future Enhancement)</i>		
ii. Ability to search two or more words in a sentence in any specified order	45 PTO has no current plans to implement. Although this feature was mentioned occasionally in interviews, it is not an across-the-board priority.	32.00
zz. Capability to save the NDC anytime in the search session	46 The desktop deployment project (1996-1999) will introduce this capacity.	29.00
ff. Page buffering at the shared, single screen text terminals and image workstations, as well as on my PC	47 The shared use text terminals will be totally replaced by end of year 1994 with all PCs connected to PTOne. All image workstations will be replaced as a part of the desktop deployment project.	29.00
jj. Ability to search on a sequence of layered materials	48 This is not currently included in PTO's plans. While not a priority overall, almost half of all chemical group examiners believe this feature could have a major impact on their productivity.	28.00
	The SUS project - just completed - that adds 48 machines as well as some new printers, responds to this situation.	28.00
ee. More machines available at peak usage periods in my work area (either shared, single screen text terminals or image workstations)	49 PTO has no plans to implement	28.00
aaa. An assignee search function that really works	50	
ii. Ability to search on a chemical structure	51 PTO has no plan to address this. Although not a high priority for the entire corps, over 61% of chemical group respondents say it will have a major impact on their productivity.	26.00
a. More access to APS and the walk-up printers on Saturdays and Sundays	52 Saturday and Sunday hours were expanded, 8am to 5pm, starting on 10/1/94	25.00
b. More access to APS and the walk-up printers on weekday evenings	53 Weekday evenings were expanded earlier in the year to 9pm; no plans to extend hours beyond this time frame.	19.00
hh. Ability to search on a mathematical equation	54 PTO has no plans to implement: None of the three separate disciplines saw this as a great need	16.00

Chapter 9: DEMOGRAPHICS

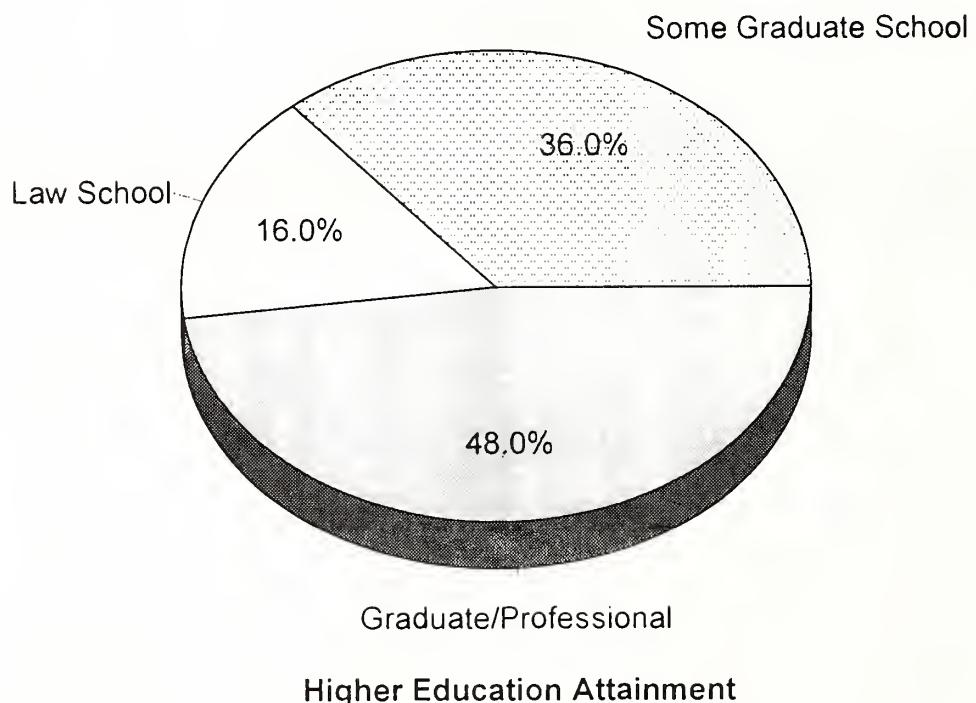
Responses to the survey were evenly distributed across the entire examining group as the chart below illustrates:



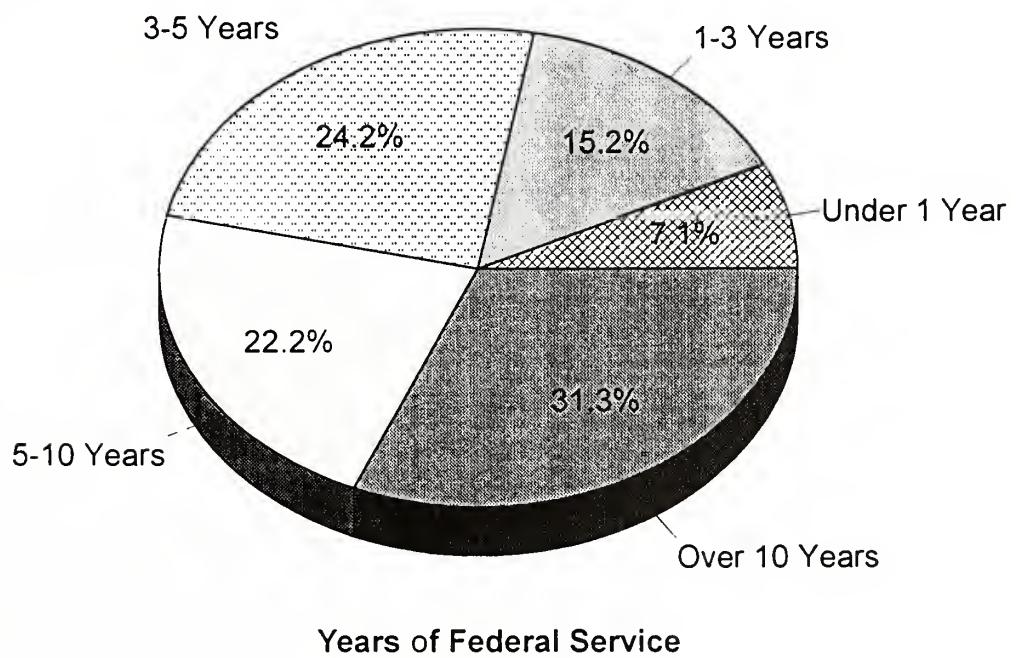
Likewise, a good representation came from the different examining groups, allowing follow-up analyses that can associate specific problem areas with specific examining groups.

Name of Examining Group	Q49. Which examining group are you currently assigned to?	% Response distribution	Number of Respondents
General, Metallurgical, Inorganic, Petroleum and Electrical Chemical and Engineering	1100	8.00	58
Organic Chemistry Drug, Bio-Affecting and Body Treating Composition	1200	4.00	26
Specialized Chemical Industries and Chemical Engineering	1300	5.00	34
High Polymer Chemistry, Plastics, Coating, Photography, Stock Materials and Composition	1500	6.00	44
Biotechnology	1800	9.00	64
Industrial Electronics	2100	6.00	40
Special Laws Administration & Designs - Utility Patents	2200	3.00	18
Information Processing, Storage and Retrieval	2300	7.00	51
Packages, Cleaning, Textiles and Geometrical Instruments	2400	5.00	32
Electronic and Optical Systems and Devices	2500	11.00	77
Communications, Measuring, Testing and Lamp/Discharge	2600	10.00	69
Special Laws Administration & Designs - Designs Patents	2900	2.00	16
Handling and Transportation Media	3100	4.00	31
Material Shipping, Article Manufacturing, Tools	3200	5.00	32
Surgery, Animal Husbandry, Medical Technology, Amusements and Exercise Devices and Printing	3300	6.00	40
Solar Heat, Power and Fluid Engineering Devices	3400	5.00	35
General Construction, Petroleum and Mining Engineering	3500	6.00	40

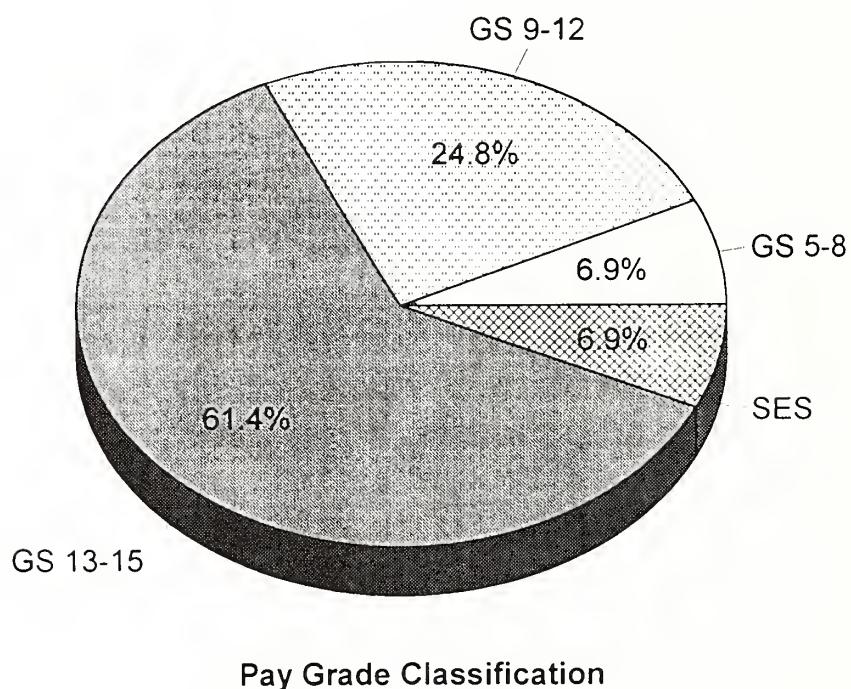
The examining corps is comprised of highly-educated professionals who are, for the most part, well along on the federal career path. While all examiners have -- at the least -- earned a baccalaureate degree, sixteen percent (16%) are law school graduates and forty-eight percent (48%) have a graduate or technical degree in another discipline. Another thirty-six percent (36%) have completed work towards a graduate degree. These educational attainments are reflected in this chart:



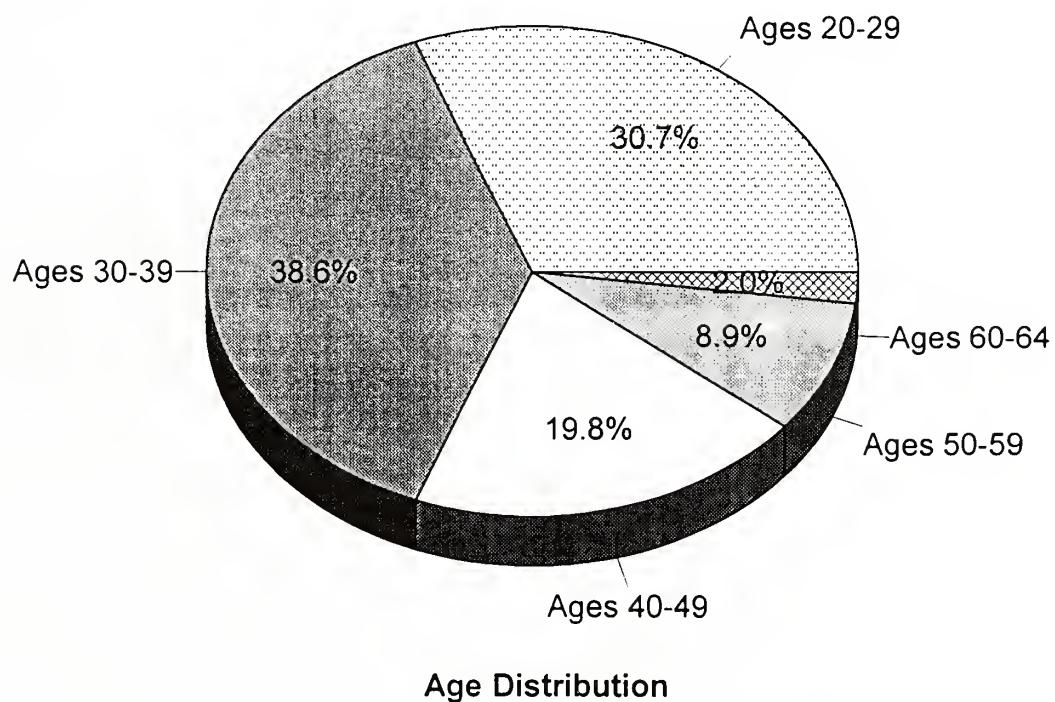
Respondents were about equally divided between those who had more or less than five years of experience as a federal employee -- although nearly one-third (31%) had more than ten years of service. The actual employee service distribution was:



Nearly seven out of ten (69%) of all respondents have federal pay classifications of above the GS-13 level. One-fourth (25%) hold journeyman GS-9 to 12 classifications. A smaller group (7%) are entry level examiners -- GS-5 to 8 classification. Another smaller group (7%) hold senior executive service status.

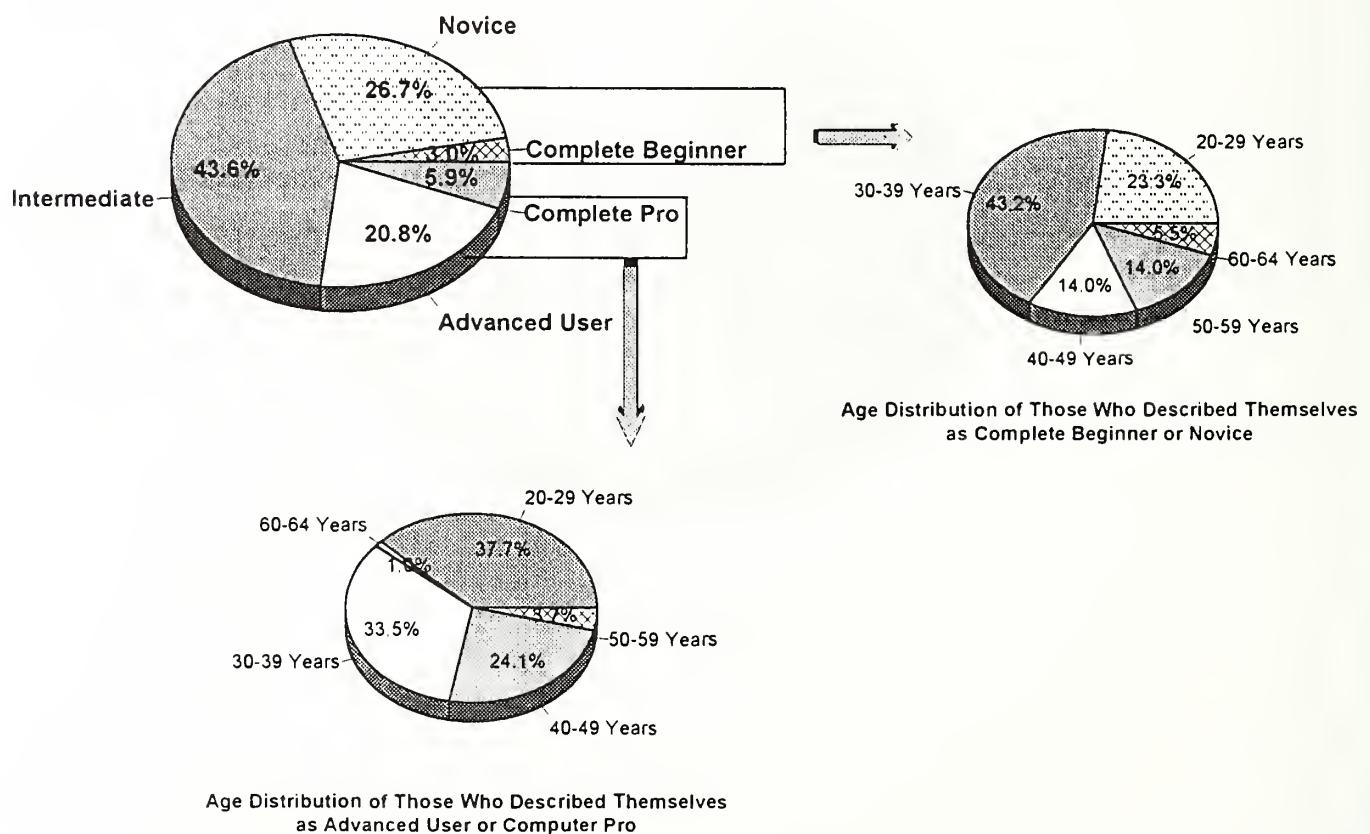


An overwhelming majority of responding examiners (70%) are under forty years of age. Another twenty percent (20%) reported themselves to be between forty and fifty. Only eleven percent (11%) reported themselves as over fifty years of age. The chart below depicts the age spread of respondents:



The age spread of respondents was included as a useful demographic to instruct analysis regarding computer expertise and to provide a statistical tool for assessing whether any given segment of examiners -- such as those who entered the corps before the advent of computers -- most needed training and skill development. As the charts below illustrate, both computer expertise and inexperience are distributed across age spectrums. As might be expected, however, examiners in their twenties -- who have "grown up" with computers -- predominate in the "computer pro" category.

Computer Experience



Of the entire group of seven hundred and twenty-four (724) respondents to the survey, forty percent (40%) are classified as primary examiners. About six percent (6%) of all respondents reported their status as supervisory patent examiner. These response statistics conform generally with their actual distribution throughout the examining corps.

Chapter 10: CONCLUSIONS

For the foreseeable future, the examining corps of PTO will depend on both manual and automated tools to conduct and conclude their searches. Dependency on APS is growing as more examiners and the general public have access to this technology. Given the imminent and near universal availability of personal computers at examiners' desktops, this particular mode of accessing APS will increase both dependency and usage. Within the not distant future, remote access opportunities -- for both examiners and the public -- will make APS accessible virtually around the globe with the flick of a switch.

The development and delivery of APS to both examiners and the public has posed considerable challenge to the Patent and Trademark Office and to the vendors who engineered the system, deployed its products and now support it. It is still not perfect and much work is yet to be done over the next five years. But APS' current capabilities represent an extraordinary accomplishment when one remembers that none of this technology existed a decade ago. As one examiner put it, "we ought not pillory the pioneers."

In order to make the program fully successful, PTO will need to provide a considerable amount of on-going review, discipline and management oversight regarding how the system will be expanded and supported. Central to this responsibility is the need to pay close attention to the emerging needs of its primary users -- the examining corps and the public. This should result in an increased responsibility to the performance-related issues raised in this report.

PTO should not overlook the bedrock reality that the effectiveness of this technology is inescapably linked to the ability of real people to use it well. In order to take full advantage of the resources imbedded in the technology, examiners -- and all users -- must be trained to understand and use these electronic tools wisely.

In conclusion, PTO and all vendors associated with this project have much work yet to do as user needs and expectations rise with the tide of technological changes yet to come. But for now, a combination of anecdotal, internal reports and survey findings strongly support the conclusion that APS is currently meeting most examiners' basic business needs.

Chapter 11: APPENDICES

Appendix A

Current State-of-the-Art Issues

Three areas of technology advancement afford particular opportunity to enhance the productivity of examiners using APS. They are the increased price performance ratio of workstations, the maturity of the client/server architectural concept, and the emergence of Standard Generalized Markup Language (SGML) as a widely accepted document interchange standard. This section describes the current and planned activities to incorporate state of the art technology in each of these areas into APS.

Increased Workstation Price Performance

Providing every examiner with desktop access to APS has always been a PTO goal. Until now, two obstacles have delayed achievement of that objective. The first was the cost of the hardware required to effectively meet patent examination requirements. The second was the lack of a workstation operating system environment capable of smoothly integrating APS with office automation and other desktop applications on which the examiners depend. Both of these obstacles are rapidly disappearing.

The continual reduction in workstation costs now makes it possible to configure an affordable desktop hardware platform capable of running APS effectively. Experiments are underway to determine the most cost effective display monitor arrangement for desktop deployment, as this is still a significant cost component. Recent announcements by operating system vendors provide several options for integrating APS with office automation and other desktop applications. Experiments are underway which will lead to the selection of the strategic operating system environment for desktop deployment.

The advancements in workstation hardware and operating system technology also allow the development of robust high-performance network servers capable of performing functions previously implemented on more expensive mainframe computers. The PTO is currently developing a plan to migrate the image database indexing function from proprietary software operating on the mainframe to COTS software operating on a network server.¹

Client/Server Architecture

Client/server architecture as a preferred model for network configuration has now gained almost universal acceptability. In such environments, one dedicated computer -- called a *server* -- controls all the programs and peripherals that are part of the network. Any personal computer or workstation that accesses information or relies on its software to perform tasks it cannot do on its own is called a *client*.

This arrangement has many advantages. Because the server is required to function as the real "work horse" of the network, much of the computing power can be centralized in one space. With its added power, the server can perform at a much higher and faster level, eliminating the need to empower every single computer or workstation with equal capacity. This also means that clients can operate efficiently with far less capacity and can also avoid overloading themselves individually with software that they require only on an episodic basis.

The maturation of the client/server architectural concept has led to the definition and acceptance of standards for the interface between clients and common server functions. As a result, a variety of commercial-off-the-shelf (COTS) products exist that implement server functions in a standard way. Because the client logic that manages the user interface is isolated from the server logic that manages the data and the complex dependent algorithms, installations can make substantial changes in server technology and topology² with a minimum impact to end users.

The initial APS design, in general, followed the client/server paradigm. However, at that time there were few widely accepted standards for client/server interfaces and almost a complete absence of COTS products relevant to APS. Now that client/server topology has grown to such widespread acceptability and an array of useful products are available, PTO has two key efforts underway which will incorporate state-of-the-art client/server technology into APS.

¹The ability to use commercial-off-the-shelf (COTS) software will reduce the time and money required to develop new technology and greatly accelerate the speed with which cutting edge enhancements can be introduced into APS and other office automation systems.

²Topology is the term used to describe the physical layout of a local area network (LAN).

The new SUS deployment of APS implements a rigid separation of the browse application logic that manages the examiner interface from the logic that manages the image databases. The image database management logic is implemented in an APS subsystem called Generalized Image Service (GIS). The browse application retrieves image data from GIS across a technology independent application programming interface. This architected partitioning of function will allow the PTO to procure and install advanced COTS-based servers for managing image data with minimum impact on the browse application logic and the examiners with which it interfaces.

The current text search component of APS is not implemented within a client server architecture. The bulk of user interface management logic executes in licensed software on the mainframe. This has impeded the ability to implement improvements in the user interface. The PTO plans to migrate APS text search to a client/server architecture and has specified Z39.50 as the standard protocol for client/server communications. The client application component in the workstation will have complete responsibility for managing the examiner interface. The migration of text search to a client/server architecture facilitates the following improvements:

- Replacement of the current command line orientation with a full function graphical user interface
- More rapid inclusion of search tools and other productivity enhancements
- Customization of the user interface to reflect the needs of specific examiner constituencies
- The display of patent drawings along with text
- The routing of a single query to both PTO and non-PTO search servers
- The implementation of other search strategies -- for instance, a pattern recognition search engine might be used to search non-text data or text data generated by OCR which has not been cleaned up.

The initial implementation of text search in a client/server architecture will occur in the Global Patent Initiative project.

Patent Storage in SGML

Numerous PTO projects are underway to identify requirements for managing digital image access and are now being consolidated into a single project. This effort, the Generalized Image Service (GIS) project, has as its objective the development of a single consistent interface that can effectively support all current and future projects, including Classified Search and Image Retrieval (CSIR) and other image retrieval applications (e.g., PAM, Global Patents, trademarks, assignments, etc.).

An important goal of the GIS project is to introduce Standard Generalized Markup Language (SGML), which will enable the identification of separate parts of a document. By tagging the parts of a document using SGML standards, customers may tailor retrieval and viewing of the document to their specific needs. Over the next several years, worldwide patent offices will issue and interchange patents as SGML tagged documents. SGML will facilitate the creation of a full copy of the global patent in the original language and an abbreviated copy containing text elements that have been translated into English.

A patent marked up in SGML will be a compound document in that each component will be stored in the format most suitable for that component. Text components will be stored as machine processable text. Although most drawings will be stored as raster images, some drawings may be stored in machine processable vector format. Equations and formulas may be stored in specialized machine processable representations.

The markup of patents in SGML facilitates a variety of user interface enhancements. For instance, while a drawing is displayed in one window, the examiner might scroll through items of text that reference the drawing in another window. Notes and annotations can be tied to specific document components.

Currently, the PTO maintains about a million bytes of data for the average U.S. Patent. This includes a complete set of page images at 150 dpi for browsing, a complete set of page images at 300 dpi for printing, and a copy of the text sections for searching. The typical SGML patent will require about 130 thousand bytes of storage. The conversion of pre-grant and weekly issue patents to SGML format will dramatically reduce the rate at which new storage servers must be added to APS resulting in reduced hardware costs and less operational complexity.

The PTO is obligated to make patents available to the public. The demand for copies of patents in raster image format is limited by their size and their inability to be machine processed. Their size also limits the feasibility of their distribution across the Internet or other wide area network. The reduced size and increased informational content of SGML patents will offer a variety of new options for public access and distribution.

The APS GIS and the APS display server is currently being enhanced to support SGML patents. Prototyping activity is planned to determine the appropriate changes required in APS to display and print a mix of SGML and raster image patents.

Appendix B

Schedule of APS Patent-Related Activities: FY1995-FY2000

The Patent and Trademark Office's *Strategic Information Technology Plan: FY1995-FY2000* describes the planned enhancements, replacements and modifications¹ of the automated information systems and subsystems that make up the Automated Patent System. This document was initially produced on June 24, 1994; a revised version was released on October 24, 1994.

The following is a brief description of the major patent-related system design and development activities planned by PTO for the Automated Patent System.

Classified Search and Image Retrieval (CSIR)

This system provides the basic image searching capability of the Automated Patent System. Introduced originally in 1988, new and improved features have been added incrementally as new technology became available. At present, image searching is available from dual screen workstations that are accessible to about one-fourth (22%) of the examining corps. By the end of this decade, virtually all examiners will have this capability at their desktop.

In the meanwhile, a third generation shared-use workstation is scheduled to be introduced by mid-March, 1995. While the first and second generation workstations -- introduced during the 1988-1992 period -- were entirely custom-built, the third generation equipment is a hybrid of commercial and customer-built hardware and software. This latest technology will be available at forty-eight (48) shared-use workstations and supported by eight (8) group printers.

¹Although the emphasis in the document is on outlining projects planned for the period FY1995-FY2000, projected and actual activity and product milestones are described for all tasks and products associated with PTO's Automated Patent System project since its initiation eleven years ago. Consequently, you will see FY1994 in the deployment dates following each project described below.

Desktop Deployment Project - FY1996-FY1999

Desktop access to both image and text searching capability was one of the most frequently requested enhancements mentioned by the examining corps -- both during the focus group discussions and in the survey results. PTO's strategic plan calls for a complete response to this need beginning in 1996, at which time distribution of commercially available CSIR workstations to every patent examiner and classifier will begin. Through these desktop workstations, examiners will have access to both image and text search capability as well as other office automation services scheduled to be introduced. Upgraded group printers will support this expanded capability as the project is fully implemented over the next four years.

Examination Toolbox Project - FY1995-FY1999

As highly-individualized research requirements emerge from different art groups, some examining groups have developed "homegrown" tools to facilitate their work. (Work group developed software designed to meet local application requirements is a growing trend in most private sectors where software dependence is significant.) While PTO encourages the creativity that generates such products, this project will regularize how actual user requirements are implemented and will provide an evaluation framework for determining whether commercial-off-the-shelf (COTS) products or those developed by PTO offer the best solutions to examiner needs.

Toward that end, the Examination Toolkit Project was established in April, 1994 and follows a matrix management team approach which involves both the Offices of the Chief Information Officer and the Assistant Commissioner for Patents. The purpose of this project is to develop an integrated set of information handling desktop tools that can facilitate the work of the examining corps. Specifically, the Examination Toolkit program will:

- Identify standards to be used in tool development that can be followed and enforced throughout the corps, thereby ensuring broad-based application of such tools and providing a basis for uniform operations support;
- Determine and evaluate the need for specific examination tools, thereby guarding against duplication and wasteful proliferation;
- Evaluate potential products able to satisfy the specific needs, thereby providing a framework for determining what tool provides the best remedy to corps needs; and,
- Follow LCM methodologies to develop, integrate, test and deploy tools, thereby ensuring the reliability and transferability of such tools and standard measurements to evaluate performance.

Some examples of tools currently being considered for this project include electronic manuals, forms creation, image browsing tools, text search assisting tools, expert help systems, communication tools, and interface tools to other subsystems on PTOnet.

Patent and Trademark Copy Sales (PTCS) Project - FY1995-FY2000

The PTCS is a standalone order entry and production system that enables both the public and the PTO staff to place orders for copies of patents and trademarks. Order information for patent copies is passed to the APS system, which retrieves the images of the patents from the high resolution database. Patent copies are then printed out and subsequently processed to associate them with a specific order for packaging and distribution.

This five-year project will support the maintenance and upgrade of PCTS, including all the necessary modifications required to implement the Pre-Grant Publication (PGPub) system.

Pre-Grant Publication (PGPub) System Project - FY1996

This new project requires the development and implementation of a system which can ensure electronic access to patent applications eighteen (18) months after they have been filed with PTO. When complete, the system will incorporate published application data into PTO's paper and electronic search files. This will allow more timely access to the contents of the application search file to both patent examiners and the public.

The PGPub system -- which will provide some of the capabilities associated with the Patent Application Management (PAM) system -- will eventually be incorporated into PAM if the PTO is able to proceed with the project.

Patent Application Management (PAM)

PAM is a long-term systems development program which will provide complete automation of the application process. The system is expected to simplify the corps search activities and improve communication with the applicants or their agents. The system will also provide enhanced tracking of patent actions throughout all phases of the application search, examination and issue process. Another antecedent system -- PALM, which is discussed next -- is already operational.

Over the course of the next five years, three major on-going activities will form the evolutionary bedrock of PAM as it is currently envisioned. They are: 1) Maintenance and upgrade of the current PALM system; 2) Development of the EASY software; and, ultimately, 3) Development of the PAM system itself.

Patent Application Location and Monitoring (PALM) System Project - FY1994-FY2000

PALM currently provides workflow tracking and status reporting for all patent application processing, including application file location, status, title, legal representation and other statistics about examiner production and docket information. The PALM system runs on a mainframe with over 2,000 display terminals, bar code readers and printers directly connected to the mainframe.

Between now and the year 2000, the PALM system will continue to require enhancements, maintenance and hardware and system software upgrade activities. This transitional system will ultimately be replaced when the new Patent Application Management (PAM) system is completed in the year 2000. Transitional activities include the replacement of PALM terminals and bar code readers with PCs, which will be linked to PTOnet. Changes will also be made to PALM to support the PGPub project (see previous reference.)

Electronic Application System (EASY) - FY1995-FY1998

The Electronic Application System (EASY) project will provide authoring and validation software to allow patent applicants to create and submit electronic patent applications. This software will serve as the basis for electronic application filing and is part of an international alliance which includes the PTO, the European Patent Office (EPO) and World Intellectual Property Organization (WIPO). When fully implemented, the EASY software will feature streamlined and more efficient authoring of patent applications, validation of the application package, calculation of fees and electronic signature.

While PTO's objective is to complete the EASY project by the year 2000, current budget levels do not support this goal. A determination has not yet been made on whether or not funding for this project will be increased.

Patent Application Management (PAM) System - FY1995-FY2000

PTO now relies on essentially manual procedures for processing patent applications (See description of the process in the Introduction section of this report.) PTO's long-term ambitions for fully automating the application process through PAM are far-reaching. Among their stated goals, PTO aims to reduce the cost of patent application processing, improve quality through workload and process management, reduce patent pendency, facilitate international exchange of patent information, improve the protection of intellectual property, improve effective access to PTO information by internal users and the public, improve management reporting capabilities, improve security and improve the efficiency of patent application management.

PTO has approached this systems development project through reliance on a combination of in-house and contracted resources. Future development will rely on existing and planned PTO hardware and software components and consolidation of PAM requirements into PTO-wide acquisitions of other components. The development of the PAM system will be contracted for under the System Development and Maintenance (SDM) contract to be awarded in FY1996.

The FY1995-FY1996 phase of this project will consist of preliminary business processing engineering, functional requirement analysis, basic architectural studies, along with data and activity modeling. Follow-on phases will be directly shaped by the evolution of the PGPub system (described previously) which will contain many of the bedrock features required by PAM.

Classification Data Systems (CDS)

This system maintains classification data for all patent and application documents. CDS supports the US patent classification, foreign patent classification, issued patent list and patent file maintenance. From 1982 to 1992, Power Computing provided remote batch processing services to support the classification function. PTO decided to bring the classification system operation in-house in 1992 and awarded a contract to TAMSCO to continue development of CDS.

Placed in production in January, 1993 (FY1993), CDS version 1.0 supports the U.S. patent classification system by tracking Miscellaneous Transfers, Weekly Issues, and Clerical entry of Reclassification project data.

CDS Version 1.1 - FY1995-FY1996

This project involves the development of an improved software for CDS, which will provide patent classifiers with a better tool to support the U.S. patent classification system. Desktop microcomputers, linked to APS via PTOnet, will be provided to all classifiers. CDS 1.1 will provide classifiers with a number of new features, including improved reclassification tools, cross link query capabilities, a class and subclass reference index, and access to domestic and international search aids.

CDS Version 2.0 - FY1997-FY1999

This project involves the upgrading of the existing CDS hardware and the CDS 1.1 software system. Some of the features that are being considered for development under the CDS 2.0 project are: international search tools; a dispute decision database; group printers for the Office of Classification Systems; the addition of desktop-accessible images to classifier functions; matrix classification; automated foreign language translation support; and the complete integration of the CDS 1.1 capability to add drawings to definitions.

Text Search

The APS text search platform allows examiners, classifiers and public users to search and retrieve patent text information. The search system provides a customized user search interface and an access software product called Messenger -- licensed to PTO by the Chemical Abstracts Society. In addition to U.S. patent text, Messenger accesses PTO's database of Japanese patent abstracts. Messenger customers rely on Classification Data Systems (CDS) for relating patents with class/subclass data. Search tools -- such as concordances and examiner search procedures and guidelines -- support various other text search activities.

Because of the large costs required to maintain the customized Messenger system, the PTO has planned an accelerated enhancement of the current text search capability (referred to as the Messenger replacement project). In addition, PTO envisions that other useful applications can be derived from the Messenger replacement program.

Messenger Replacement Project - FY1995-FY2000

This project involves the replacement of the customized Messenger software system, which is currently used to access Text Search, with a commercially available software product.² PTO plans to issue a Request for Proposal (RFP) for this project in FY1997; a contract will be awarded in FY1998. The Messenger Replacement Project will also link Text Search to CDS, PAM, the text search portion of Assignments, Trademark systems, external databases, and the Global Patents project.

Global Patents

In support of international treaties, examiners currently use a manual process for searching foreign patent data -- except for a small subset of Japanese patent abstracts which examiners may access through the current automated text search system. While patents issued by foreign countries have become increasingly important in establishing the validity of a US patent, the PTO's ability to organize and maintain a searchable collection of foreign patent literature is currently limited.

²If an appropriate software product does not currently exists, PTO plans to establish a partnership with an industry leader to develop a software product that would eventually become commercially available.

Global Patents Project - FY1995-FY2000

This project has the goal of introducing an integrated system that will allow examiners to access European and Japanese patents from their desktop. The project will be implemented in an incremental fashion. Initially, examiners will be able to search and retrieve an English language abstract of the Japanese or European abstract, as well as an image of the main drawing. Later, the full images of the first few pages of the patent will be available at the desktop. Examiners will also have available to them a full array of foreign patent search tools, including technology classifications, indices, thesauri and concordances. PTO also plans to make this system available to the public through the Patent and Trademark Depository Libraries (PTDLs).

Non-Patent Literature

As part of the examination search process, patent examiners must search existing literature -- including magazines and periodicals, advertisements and books -- which have been cited by the applicant or otherwise available to the public. Currently, some non-patent literature (NPL) exists in the paper search files -- "the shoes" -- and is routinely used by examiners in their searches. However, the NPL paper search file component has not been inventoried and little is known about the characteristics of the documents it contains. Examiners also have access to a collection of NPL maintained by the Scientific and Technical Information Center (STIC) and, by extension, to outside institutions which support the Interlibrary Loan Service.

Although APS has no internal, automated NPL search and retrieval capability, it does provide an interface to external electronic search data bases which contain non-patent literature. Also, no formal business process exists to (a) identify NPL which should be added to the paper search files in a structured fashion; (b) maintain an inventory, similar to the Master Classification File, of NPL documents which have been placed in the search file; or (c) remove NPL from the paper search file when it has outlived its usefulness.

Non-Patent Literature (NPL) Project - FY1999

This project involves the development and deployment of NPL³ search and retrieval capabilities, including access to external databases and the incorporation of literature accompanying a patent application. PTO will begin defining the scope of the NPL Project in FY1999.

³Examiners can find NPL, which includes periodical and journal articles and books, in a variety of places. Although some NPL can be found in PTO's paper search files, this material has never been inventoried. Examiners also access NPL through external databases made available to them through the Text and Image Search systems, at their desktop PC, and at the Scientific and Technical Information Center (STIC).

Appeals Case Tracking System (ACTS)

The Board of Patent Appeals and Interferences (BOPAI) tracks information on each appeals case. This includes production information for each of three Examiners in Chief who review the case and decide to accept, deny or accept in part an appeal. It also reports the decision and decision date. Implemented in 1990, the Appeals Case Tracking System (ACTS) records and manages this information using 30 terminals attached to an ACTS server running the dBase III software system. However, because of the extremely low budgetary constraints involved with the development of the original system, the reporting capability remains limited.

The proposed project will result in a rewriting of the original system to take advantage of PTOnet access and up-to-date software such as Paradox. This project also includes numerous activities aimed at correcting the problems of the original system. (It should be noted, however, that new BOPAI management are discussing other ways to obtain the performance/production reports needed.)

ACTS Project - FY1995-FY1996

This project involves the enhancement of the Appeals Case Tracking System, which records and manages information on appeals cases as tracked by the Board of Patent Appeals and Interferences (BOPAI). This information is used to produce reports on production and performance. Although PTO is considering other methods⁴ to produce the necessary BOPIA reports, it is currently assumed that the ACTS Project will continue through FY1996.

⁴One such approach would link the report requirement to the PALM system.

Appendix C

Definition of Terms

APS access (Log-in ID and Password): Access to APS is controlled by two sets of numbers: (1) a (constant) log-in ID and a password (which periodically must be changed) for accessing APS through image workstations (text and image accessibility) or single screen, shared-use text terminals (text only accessibility); and (2) an entirely different (constant) log-in ID and a password (which periodically must be changed) for accessing PTOnet at a desktop PC. Some patent examiners are able to access APS text from their desktop PC through modems which have been provided by PTO or purchased by the examiners themselves.

APS coverage: APS' text and image retrieval capabilities provide patent examiners with access to two distinct sets of U.S. patent material. Patent examiners with access to image retrieval are theoretically able to look at 5.8 million U.S. patents dating back to 1790. In practice, patent examiners find that some patents (or pages within those patents) are "not available" to them. U.S. patents available for text search and retrieval date back to 1971.

APS hours of operation: APS Text and Image Search is now available to examiners from 6:30 am - 9:00 p.m. Monday through Friday and from 7:30 a.m. - 5:00 p.m. on Saturday, Sunday and some holidays.

Art unit: An art unit is a subgroup of one of PTO's sixteen examining groups. Examining groups are divided into four to sixteen art units, each of which is represented by a four digit number. For example, art unit 1302 (*Food or edible material, processes, compositions and products*) is one of the eight subgroups which make up Group 1300 (*Specialized chemical industries and chemical engineering*). Art units are headed by a Supervisory Patent Examiner (SPE).

Assignee search function: In an APS Text Search, one index or specific area of a patent available to word search are the names of companies, corporations, or persons to which patents are assigned.

Automated Information Systems (AIS): PTO's automated infrastructure includes a number of distinct and complimentary automated information systems. Many of the PTO's management information and day-to-day operating processes are also automated and dependent on the availability of adequate information technology resources for support. PTO's AIS serve a wide variety of users and there will continue to be rapidly developing and diverse opportunities to employ information technology to improve how the PTO conducts its business.

Automated Patent System (APS): The Automated Patent System (APS) is comprised of several major automated information systems which have been or are being developed to automate all aspects of PTO's patent operations. The systems which are projected to make up APS in the future include the Classified Search-Image Retrieval (CSIR) system, the Classification Data Systems (CDS) system, the Text Search system, the Patent Application Management (PAM) system, and the Global Patents System. The latter two systems are not yet operational. PTO is planning to add two additional automated information systems to APS in the future: a Non-Patent Literature (NPL) system and an Appeals Case Tracking System (ACTS).

Boolean logic: Boolean logic pertains to an algebraic combinatorial system treating variables, such as propositions and computer logic elements, through which multiple terms can be searched on APS using the operators AND, OR and NOT.

"Break" function key: The "break" function key on the cluster workstation terminals is supposed to allow a user to terminate an executed operation before it is completed.

Business Process Reengineering (BPR): The objective of Business Process Reengineering, a management technique widely used throughout the private sector, is to significantly improve the efficiency and effectiveness of an organization's processes. PTO recently established a BPR program and has aggressively pursued its expansion. In 1994, a newly established Office of Business Process Reengineering began the development of a new vision for PTO operations.

Center for Quality Services (CQS): PTO's Center for Quality Services provides guidance, coordination and assistance for ensuring quality services to internal and external customers. The center's activities include assistance in understanding customer needs and expectations so that quality services can be defined; establishing service standards; measuring customer satisfaction; benchmarking; and, determining the policy and requirements of necessary training for a quality-driven work force.

Computer Aided Software Engineering (CASE) tools: Computer Aided Software Engineering tools are used to support the implementation of the information engineering methodology and the software applications that automate (at least in part) a particular task, such as development of documentation or writing program code. PTO has chosen CASE tools to assist in the development and maintenance of its automated information systems. These tools are expected to aid PTO in achieving specific goals, such as: to focus on strategic planning and business goals to build systems that better meet PTO "corporate" needs; to better integrate information systems by using shared data that is centrally controlled; and to stabilize representation of data that will not dramatically change as business procedures change.

Chief Information Officer (CIO): PTO's Chief Information Officer is the principal advisor to the Commissioner of Patents and Trademarks on the evaluation of information technology, the architectural design of automated initiatives, and the development of strategic information technology plans.

Classification: A number of schedules, definitions, indices and other search tools have been developed to organize U.S. and foreign patents and non-patent literature into technical categories or classifications. These classification schemes include the U.S. Patent Classification System; classification schemes developed by foreign governments, such as the European Patent Office (EPO) and the Japanese Patent Office (JPO); the International Patent Classification system; and the classification schemes developed for commercial databases. Every patent application received by PTO is assigned a class and a subclass number. These numbers determine which examining group and art unit the application should be assigned to and which art the examiner should search to make a patentability decision. The U.S. Patent Classification System is continually revised and patents are routinely reclassified in order to make the system more efficient and accurate.

Classification Data Systems: One of the five major automated information systems that make up the Automated Patent System, the Classification Data Systems (CDS) system makes it possible to maintain classification data for all patent and application documents within a unified database. CDS was first introduced in 1982 and updated in 1993. An incremental enhancement project to improve hardware and software is scheduled for deployment over the period FY1995-FY1999.

Classified Search-Image Retrieval (CSIR): One of the major automated information systems that make up the Automated Patent System, the Classified Search-Image Retrieval (CSIR) system provides image searching of over 5.8 million patents dating back to 1790 on dual screen workstations to four of the sixteen Patent Examining Groups or approximately 23% of the Patent Examining Corps. PTO currently adds approximately 2,000 patents to the CSIR system each week. The CSIR system is comprised of the Image Search database and the CSIR software. CSIR was introduced in incremental phases beginning in 1988. Desktop deployment to all examiners is scheduled to begin in FY1996 and be completed by FY1999.

Classifiers: Classifiers analyze the subject matter of a patent application and determine its technical classification. Classifiers make primary (class) and secondary (subclass) assignments, which are primarily based on the U.S. classification system. They are also responsible for reclassifying patents.

Client-server architecture: In a client-server architecture, each application is divided into two parts: a client task communicating with the end user and a server task communicating with client tasks and/or other server tasks. The client task executes the front-end user interface application and handles only the data needed to perform specific functions. The server task performs the primary data processing tasks that need to be shared by multiple users (clients). There can be many types of servers, including print, facsimile, electronic mail, computation, application, file and database servers.

Cluster rooms: Cluster rooms house groups of the shared use image workstations and text terminals, and are located throughout the areas of the PTO which house patent examiners.

Cluster workstation: Also called an image workstation, a cluster workstation is one of a group of workstations located in a single room or cluster that allow examiners to access the CSIR and APS Text Search systems. Approximately 22% of the Patent Examining Corps -- Groups 2200, 2100, 2300 and 1200 -- currently have access to one or more clusters of the cluster workstation.

Commercial databases: There are a number of commercial, technical -- notably CAS/STN, Dialog, Orbit, Derwent, Lexis, Westlaw -- databases that have been made available to certain groups within the examining corps and even to certain patent examiners within an examining group based on their technical information needs. If patent examiners have the proper account number, they can access those databases that have been "offered" to them at several locations: from their desktop PC; from a CSIR cluster workstation; from a single screen, shared-use text terminal; or at a terminal in the Scientific and Technical Information Center (STIC).

Commercial Off-the-Shelf (COTS) software: Commercial-off-the-shelf software packages are commercially available software packages that are not customized to specific user needs.

Concordance: A concordance maintains the correlation between any class and subclass of the U.S. Patent Classification System and the corresponding class and subclass within the International Patent Classification system.

Configuration Management (CM): A configuration management program improves an organization's ability to manage and control the various components of computer hardware, software, and documentation. PTO's CM program is concerned with the baselining of automated data processing (ADP) resources and controlling changes to the baseline of any ADP resource under the CM umbrella. PTO's automated CM tool, the Product Control Management System (PCMS), was acquired in FY1994.

Database Management System (DBMS): A Database Management System is the information engineering methodology and the software applications used to manage database systems. Where cost-effective and feasible, PTO is transitioning to a standard DBMS.

Desktop PCs: PTO has placed some type of personal computer (PC) -- 386, 486 or Macintosh -- on the desktop of almost all patent examiners. At present, not all of these desktop PCs are able to access APS, either through a direct dataline connection to PTONet or through a modem. While PTO has provided modems to some examiners, other examiners have purchased and installed modems on their own.

Document Management System (DMS): PTO is developing the Document Management System to replace PTO's current image loading software, called Off-Line Load (OLL). DMS will consist of generic load software for images and the utilities necessary to maintain and report on the status of all APS end-user databases -- both text and image. DMS will also provide all support functions for text and image data, including software tools to manage data stored on the APS system; enhancement to the load of data to APS; and dissemination of the data resident on APS to the public and other customers on demand.

Electronic lexicon: An electronic lexicon would allow examiners to cross reference foreign terms with their English equivalents.

Electronic personal digest: An electronic personal digest is a tool to allow an examiner to put together an electronic collection of technical material -- such as journal articles and foreign patents -- to facilitate the examiner's individual search process.

European Patent Office (EPO): The European Patent Office is the organization responsible for maintaining patents issued by European countries.

Examiner Toolkit Project: The Examination Toolkit Project was established in 1994 -- as a matrix management team between the Office of Chief Information Officer and the Assistant Commissioner for Patents -- to identify, develop and deploy in a maintainable configuration, software tools which assist the examination process. A patent automation strategy that specifically tasks the Examination Toolkit Project with improving the quality of the search process by providing all examiners with enhanced computer functionality at their desk has also been approved by the Commissioner of Patents and Trademarks.

Examining Group: PTO's Patent Examining Corps is divided into sixteen technical examining groups, each of which is described by a four-digit number. For example, Group 1200 is responsible for examining patents which involve *Organic Chemistry Drugs and Bio-Affecting and Body Treating Compositions*, while examiners in Group 1800 are responsible for examining patents which involve *Biotechnology*. Chemical examining groups begin with #1, electrical with #2 and mechanical with #3.

File integrity: File integrity refers to the completeness of the manual and automated search files. The reliability of any given search is dependent upon all patents being available to an examiner. Searches in the manual system, "the shoes," are often compromised because all patents are not always available. This is particularly true in very active arts, such as biotechnology or computer systems. While examiners are sometimes given a "patent not available" message using CSIR or Text Search, file integrity in general is much greater in the automated search systems.

First generation workstation: The first custom-built CSIR workstations provided to Group 2200 in 1988 and then to Groups 2100 and 2300 in 1990 and 1991, are referred to as the first generation workstations.

Flip rate: Flip rate is the time it takes to go from page-to-page or document-to-document using CSIR.

Focus group: A focus group is a gathering of commentators (in this case, the front-end users of APS -- the patent examining corps) to elicit their opinion on a given subject (the extent to which APS is meeting their information needs). Focus group sessions are typically kept small, in terms of the number of people, and informal, in terms of the approach to engaging people in the discussion.

Foreign art: Many patent examiners need to research foreign patents for a substantial percentage of their cases. Foreign text can be accessed through several sources, including APS text, commercial databases, and the shoes. The only foreign art currently available on APS -- through the text-search-only, shared-use text terminals -- is Japanese Patent Office (JPO) abstracts dating back to 1980. Foreign images are currently not available at all on the image workstations. Many patent examiners research foreign art through commercial databases that have been made available to them by PTO. One of the primary database sources for foreign patents is Derwent, a London-based service that provides well-translated patent abstracts from primarily European countries, as well as Russia. Coverage by Derwent, however, is not universal, and because it is a commercial database, it is not available to the entire Patent Examining Corps. The final option for researching foreign art is to go to the shoes. There are separate shoes for storing foreign art under the corresponding U.S. patent class and subclass shoes.

Freestyle search: Freestyle search is a method of searching text in a database without limiting the search to specific fields, such as title or abstract. The search query is applied to the entire database. Lexis uses the freestyle method of searching.

Fuzzy logic: Fuzzy logic is a multivalued or "vague" logic in which everything is a matter of degree, including truth and set membership. This approach is in contrast to conventional logic which treats events as bivalent; that is, they are either true or false, in Set A or Set (not A) -- but not both. Fuzzy logic would allow for an event to be in Set A and Set (not A).

Generalized Image Service (GIS): The objective of PTO's Generalized Image Service project is to provide a standard Application Program Interface for management of and access to image data, independent of data format, media, and location. All projects related to the management of digital image access will eventually be brought under a single GIS.

Global Patents: One of the five major automated information systems that make up the Automated Patent System, the Global Patents project will ultimately make domestic and international patent information available to the examiner on the desktop. This system is expected to be deployed in the period FY1995-FY2000. PTO defines global patents as U.S. patents (text and image), foreign patents (text and image), and foreign patent search tools.

Group printer: Group printers are connected via a local area network to groups of cluster workstations for printing selected patents or text search information accessed on the workstations.

"Help" function key: The "help" function key on the cluster workstation terminals and single screen, shared text terminals is supposed to guide examiners in the use of the text search and image search systems.

Help line (305-9000) - A centralized "help line" on 305-9000 -- or the Government Client Support Help Line as it is officially known -- supports all user automation problems. PTO is currently moving away from a centralized help line structure to on-site help desks at designated locations.

High density optical storage devices (juke boxes): PTO's HDD is a high density optical storage device consisting of a Sony Autochanger, or jukebox-like peripheral, attached to a network server designed as an Intelligent Controller (IC). Currently, there are seventeen (17) active ICs with Autochanger, each capable of holding fifty (50) double-sided optical disks. The HDDs store image data at 300 dots per inch (DPI) for relatively slow speed/high resolution printing. A separate, related peripheral, the rapid access device (RAD), is used for faster image retrieval tasks (such as browsing). RADs store image data at 150 DPI.

Image workstations: See cluster workstations.

Information Resource Management (IRM) policy: PTO's recently established Information Resource Management (IRM) policy calls for the centralization of technical direction, information technology planning, policy formulation, system development and acquisition, business process improvement and IRM Program oversight under the Chief Information Officer. Day-to-day operational management of the PTO information technology infrastructure will be under the direction of the Associate Commissioner and Chief Financial Officer. This management framework will provide for the evolutionary application of new technology and foster uniformity throughout the PTO through standardization of hardware, software, and data to the maximum extent possible.

Interference prints: Interference prints are drawings of all pending applications kept in a file by subject matter which are to be searched before an application is allowed to locate any potentially interfering applications.

International Standardization Organization (ISO): The International Standardization Organization is an international organization based in Geneva. Most of the ISO's member institutes are governmental bodies from around the world. The ISO establishes international agreements for standards on products and commerce.

Internet Protocol Suite (TCP/IP): The Internet Protocol Suite is a standardization protocol for accessing the Internet -- a public communications network used in over 30 countries.

Japanese Patent Office (JPO): The Japanese Patent Office is PTO's counterpart agency in Japan.

Life Cycle Management (LCM): In January, 1994, PTO established a group to define and institutionalize a standard system development life cycle management process. A first draft of an LCM Manual was completed in July, 1994 with the assistance of the Software Productivity Consortium.

Local printer: Local printers are connected directly to a cluster workstation or single screen, shared text terminal.

Log-on/connect time: Log-on or connect time is the amount of time it takes to access any aspect of the Automated Patent System.

Messenger: Messenger is a licensed, proprietary Boolean search software that permits word, proximity and truncation searching. Developed by the Chemical Abstract Society, Messenger is used by examiners to search APS' Text Search system, the Classification Data System, and the Japanese Abstracts database.

Named Document Collection (NDC): A Named Document Collection is a set of patent images that an examiner has pulled up during a search. Examiners can save NDCs on APS for future use.

National Information Infrastructure (NII): An initiative of the Clinton/Gore Administration, the objective of the National Information Infrastructure is to bring vast amounts of information to the public via a seamless web of communications networks, computers, databases and consumer electronics. The NII initiative sets a goal to provide the broadest possible access to governmental databases, providing both the content of this information as well as a means through which this information can be distributed.

National Information Infrastructure (NII) Advisory Council: The Department of Commerce has formed the National Information Infrastructure Advisory Council to address the technical, policy, and privacy issues associated with NII.

Non-patent literature: Non-patent literature (NPL) is all of the technical literature that is used in the patent examination process that is not a U.S. or foreign patent. NPL includes journal articles, books, etc. PTO is considering the development and deployment of an NPL search and retrieval system, which it will begin defining in FY1999.

Office action: An office action is a communication from the examiner with respect to the merits of the application involved, such as a letter setting forth rejections or a Notice of Allowance.

Office of Business Process Reengineering (OBPR): The Office of Business Process Reengineering analyzes the Patent and Trademark Office's business enterprise and practices through the application of business process reengineering techniques, such as activity and simulation modeling, activity-based costing, and functional economical analysis. The Office provides central guidance, coordination, and assistance for documenting current processes; designing new processes to meet the user and customer requirements for Patent and Trademark Office products and services; researching, analyzing, and recommending policy options related to new processes; and developing plans for the transitioning from current processes to reengineered processes.

Office of Computer and Telecommunications Operations (OCTO): The Office of Computer and Telecommunications Operations manages the PTO's centralized computer, data, and telecommunications facility; provides maintenance and technical support for all distributed hardware and software throughout the agency; and provides routine modifications to meet changing program requirements and improve performance of PTO's operational production systems and communications networks.

Office of Information Dissemination (OID): The Office of Information Dissemination develops, maintains, and disseminates a diversified portfolio of patent and trademark information to the public. The OID develops electronic information products and services; distributes patent and trademark information on U.S. technological and economic activities; and provides information dissemination support services to PTO customers.

Office of System Architecture and Engineering (OSAE): The Office of System Architecture and Engineering, an office within the Office of the Chief Information Officer, develops the foundation system architecture for PTO's information technology infrastructure and plans the technological evolution of the Agency's automated information systems.

Office of System Development and Acquisition (OSDA): The Office of System Development and Acquisition, an office within the Office of the Chief Information Officer, establishes procedures, technical standards, software tools, and training that supports the system development life cycle and administers the project management structure for the development, test, implementation, and maintenance of the PTO's AIS. The OSDA acquires information technology hardware and software products and services consistent with PTO's strategic information technology plans and supporting information technology infrastructure.

Oldest effective priority date: The oldest effective priority date is the oldest filing date to which any application having a parent application is entitled priority under either 35 USC 119 or 35 USC 120.

On-line tutorial: An on-line tutorial allows a user to learn how to operate a software program while actually using the program.

Open system: The open system standards define the format in which data is exchanged, remote systems accessed, and services invoked. The acceptance of open system standards supports the creation of system architectures that can be built from technology components available from many vendors.

Patent examining corps: The patent examining corps is made up of professionals in the PTO engaged in the examination of patent applications. Members of the patent examining corps examine patent applications and reissues of patents to determine if the applicants are entitled to patents. Patent examiners also process reexamination and statutory invention registration requests and search and examine International applications filed under the Patent Cooperation Treaty.

Patent and Trademark Copy Sales (PTCS): The Patent and Trademark Copy Sales system is an automated system using the Classified Search and Image Retrieval system (CSIR) for filling requests from the public for copies of patents.

Patent and Trademark Depository Libraries (PTDL): The Patent and Trademark Depository Libraries around the country are designated libraries which receive patent and trademark information in various forms to enhance access of patent and trademark information to the general public.

Patent Application Location and Monitoring (PALM) System: The Patent Application Location and Monitoring (PALM) system is PTO's current system for tracking the location and status of a patent application through the examination process.

Patent Application Management (PAM): One of the five major automated information systems that make up the Automated Patent System, the Patent Application Management system will fully automate the patent application process, including the filing of a patent application and managing the application through PTO. This system will eventually replace the current Patent Application Location and Monitoring System (PALM) and is expected to be deployed in the period FY1995-FY2000 under the System Development and Maintenance (SDM) contract.

Patent pendency: Patent pendency is the amount of time from the receipt of the application to application issue or abandonment. The current target period for patent pendency is eighteen months.

Patent search files: The patent search files include both the automated -- through the Automated Patent System -- and paper-based -- through the shoes -- files of issued patents.

Peak usage periods: Peak usage periods are those times of the day, days of the week, and weeks of the month during which there are the highest number of users accessing the Automated Patent System.

Pre-Grant Publication (PGPub): In response to Congressional legislation, PTO recently decided to redirect the Patent Application Management (PAM) effort towards the development and implementation of the Pre-Grant Publication system. By January 1, 1996, PTO will publish patent applications within 18 months of the earliest filing date.

Primary Examiner: A patent examiner is someone who has completed a signatory review process and has been granted the full authority to finally reject applications or allow them to issue as patents on behalf of the Commissioner.

"Print" function key: The "print" function key on the cluster workstations and single screen, shared text terminals allows users to request a printed copy of data or documents.

Product Control Management System (PCMS): Product Control Management System is an automated commercial-off-the-shelf application which supports configuration management functions for identifying components, managing changes to components, releasing systems versions, and relating items for impact analysis and maintaining synchronous components. PCMS is implemented by applying the organization's policies, procedures, methodology, and life cycle processes through the tool.

PTONet: PTONet, or the PTO Network, is a comprehensive end-to-end data transmission facility linking all computers in the PTO -- from the largest mainframes to the smallest intelligent terminals. This local area network (LAN) currently connects computers in thirteen buildings in Crystal City, providing network service to approximately 3,900 customers of office automation products, data (electronic mail and document sharing), and Patent, Trademark, and other business applications stored on network file servers, mainframes, and minicomputers. The implementation of additional applications or systems, such as PAM, Desktop Workstation Deployment, Patent and Trademark Assignment System, and Global Patents will require continuous enhancements to PTONet to ensure satisfactory user support.

PTO Newsletter: The PTO Newsletter is a regular publication which aims to keep staff informed of new developments in PTO operations and systems.

Refresher/update training: Refresher or update training is considered to be any training an examiner receives on Image Search, Text Search, commercial databases, or Windows after their initial training on these systems.

Requirements Traceability Management (RTM): In order to better manage the functional and performance requirements of APS, PTO's Office of Chief Information Officer is planning to acquire an automated requirements tool called Requirements Traceability Management.

Second generation workstation: The second version of the custom-built CSIR workstations that were provided to Group 1200 and 2300, and a public search facility in 1993 are referred to as the second generation workstations.

Shared Use System (SUS) workstation: The third generation of CSIR workstations, which were supposed to be installed by mid-March, 1995, are referred to as the shared use workstations (SUS). The SUS workstations are a hybrid of commercially available and custom-built software and hardware components.

The shoes: A manual, paper-based system which antedates the introduction of automation, the shoes are comprised of wooden and metal shoebox-sized drawers which contain copies of patents dating back to the time patents were originally granted by the U.S. Government (1790). The shoes also contain a limited collection of foreign patents and non-patent literature. The shoes are housed throughout the PTO's complex of offices in Crystal City, Virginia.

Standard Generalized Markup Language (SGML): Standard Generalized Markup Language tags separate parts of a document in a standard way, enabling users to customize search, retrieval and viewing procedures to their specific needs. Within the next several years, patent offices worldwide -- including PTO -- will convert their patent publishing operations to SGML and issue and interchange patents as SGML-tagged documents. SGML will facilitate the creation of a full copy of a global patent in its original language and an abbreviated copy containing text elements that have been translated into English.

System Development and Maintenance (SDM) contractor: PTO is planning to acquire a System Development and Maintenance contractor to succeed the current APS contract, increasing the scope to provide PTO-wide support services. By the end of FY1996, the current APS contractor and several other contractors will be replaced with a SDM contractor. This new contract will serve as PTO's primary source for automation support services. The contract will be used for all planning, analysis, design, development, enhancement, and maintenance of all PTO AIS and the supporting technical infrastructure. Computer center operations, network management, and office automation support will also be within the scope of this contract.

Supervisory patent examiner (SPE): A Supervisory Patent Examiner is a senior Primary Patent Examiner who has full supervisory responsibility for an Art Unit.

System recoverability: System recoverability is defined as the extent to which APS can recover work performed by an examiner just prior to a system outage, boot-off or lock-up.

System response time: System response time is the amount of time it takes APS to respond to a command or request.

Systems Acceptance Testing/Independent Verification and Validation (SAT/IV&V): The Systems Acceptance Testing/Independent Verification and Validation process comprises all functions required to test, integrate, and install software enhancements and/or modifications to the APS product environment. Each element of this activity is accomplished within the framework of a baseline concept. A baseline consists of a variable number of software capabilities to be acceptance tested, integrated, and installed within a specific time frame.

Target search: Target search is a non-Boolean search alternative that can find the most relevant articles on a subject. Dialog uses this search form.

Text Search: One of the five major automated information systems that make up the Automated Patent System, the Text Search system allows examiners and public customers to search the full text of over 1.8 million U.S. patents issued since 1971 and the English translations of some 3.0 million Japanese Patent Office abstracts. This search tool was introduced to the examining corps in incremental phases beginning in 1986. An enhancement project to replace the current text search facility -- including hardware and software -- is scheduled for deployment in the period FY1995-FY2000. The Text Search system's search strategy is based on Boolean logic structure.

Text terminal, shared, single screen: The single screen, shared text terminals are used by Patent Examiners to access the Text Search system. These text terminals are located, typically in groups of four, in search rooms on select floors of the PTO office buildings which house patent examiners.

Thesaurus/registry feature: A thesaurus/registry feature would allow examiners to pull up all related terms and spellings of a word during the search process. This tool is one of the features most widely desired by the examining corps.

Training: Training includes all instruction on how to access and use the CSIR system, the Text Search system, as well as the various commercial databases available to examiners. Image Search training is provided by PRC. Text Search and commercial database training is provided by the Patent Academy.

Transportable Image Display Workstation (TIDW): A transportable image display workstation is any shared use image workstation which has been configured to be physically moved from the PTO site to any remote location and function to resemble an on-line device at the PTO. The TIDW may have a separate optical disk drive with sample images written on the disk, or the images may be written to a magnetic hard disc built into the TIDW to simulate an on-line image retrieval. The TIDW has a built-in modem which may be used to dial into APS for on-line access to text search and other APS system functions except image retrieval.

U.S. Patent Classification System: The U.S. Patent Classification System is a scheme for organizing patents into technical categories.

Walk-up printer: Walk-up printers have no search capabilities but can print out copies of whole patents. They are located throughout the offices which house patent examiners.

WinCOM (for hard disk): Communications software, including graphical user interfaces (GUI) which allows Patent Examiners to operate APS in a more user-friendly, Windows-like environment.

WinNET (for the PTONet): Communications software, including graphical user interfaces (GUI) which allows Patent Examiners to operate APS in a more user-friendly, Windows-like environment.

Workstation rooms: Workstation rooms house the shared use cluster workstations and text terminals, and are located throughout the offices which house patent examiners.

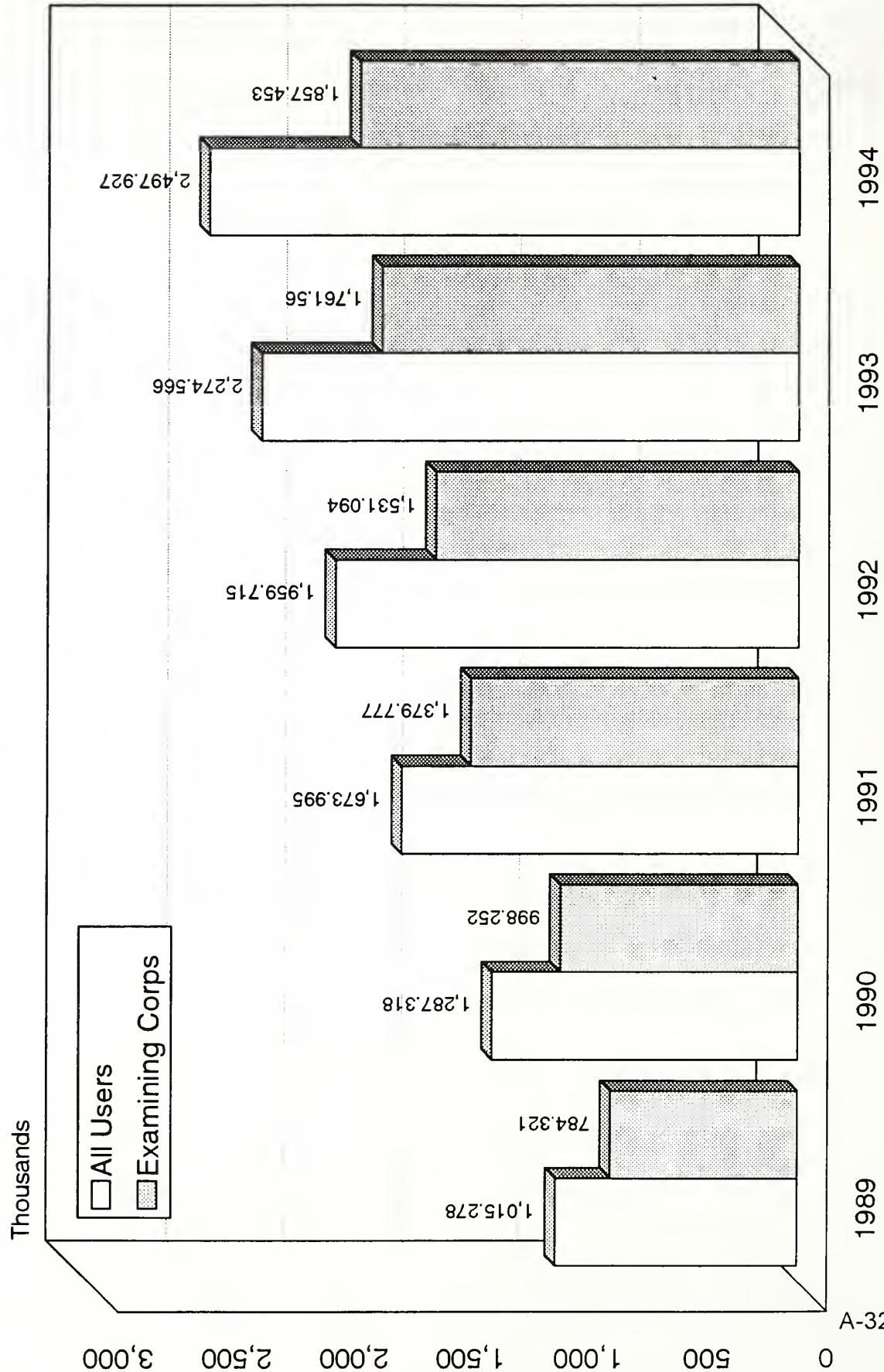
World Intellectual Property Organization (WIPO): The World Intellectual Property Organization is a specialized agency made up of 125 members of the United Nations. WIPO's objectives are to promote the protection of intellectual property throughout the world and to ensure administrative cooperation among the intellectual property unions. The headquarters for WIPO are in Geneva, Switzerland.

Xerox Network System (XNS): Xerox Network System is the network protocol previously used in the PTO. It has been replaced by TCP/IP (Transmission Control Protocol/Internet Protocol).

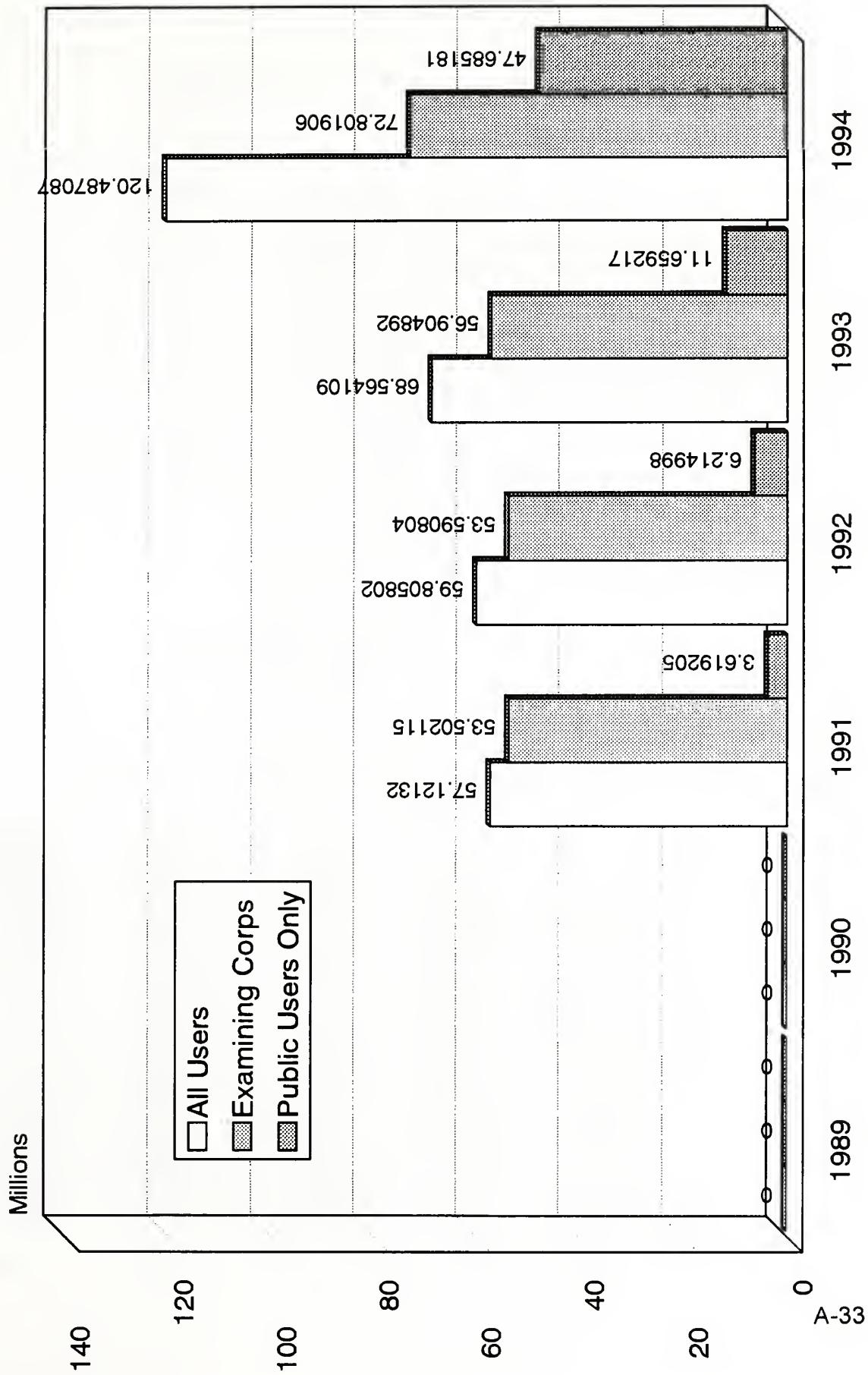
Appendix D

PTO Exhibits

Messenger Search Requests

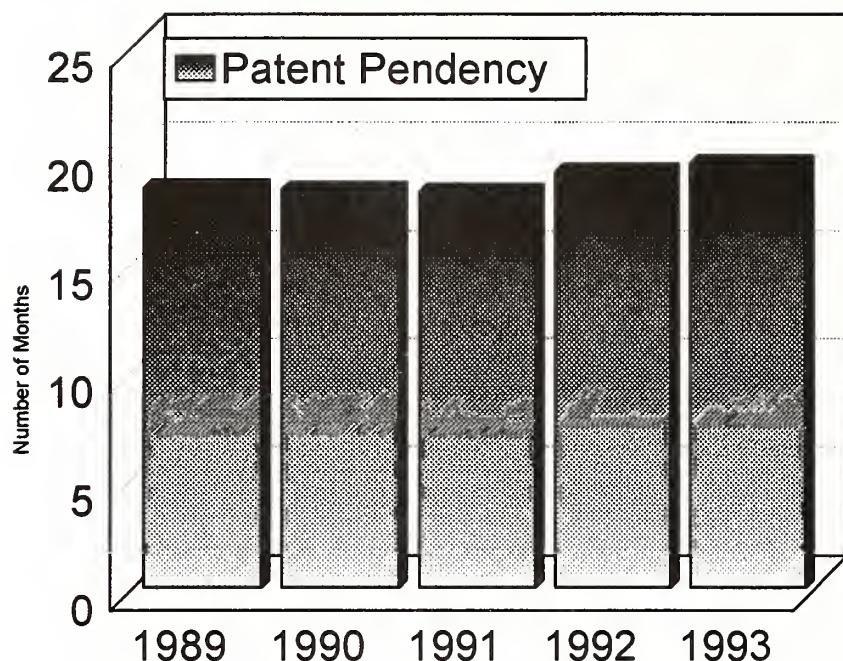


CSIR Pages Retrieved



Patent Pending

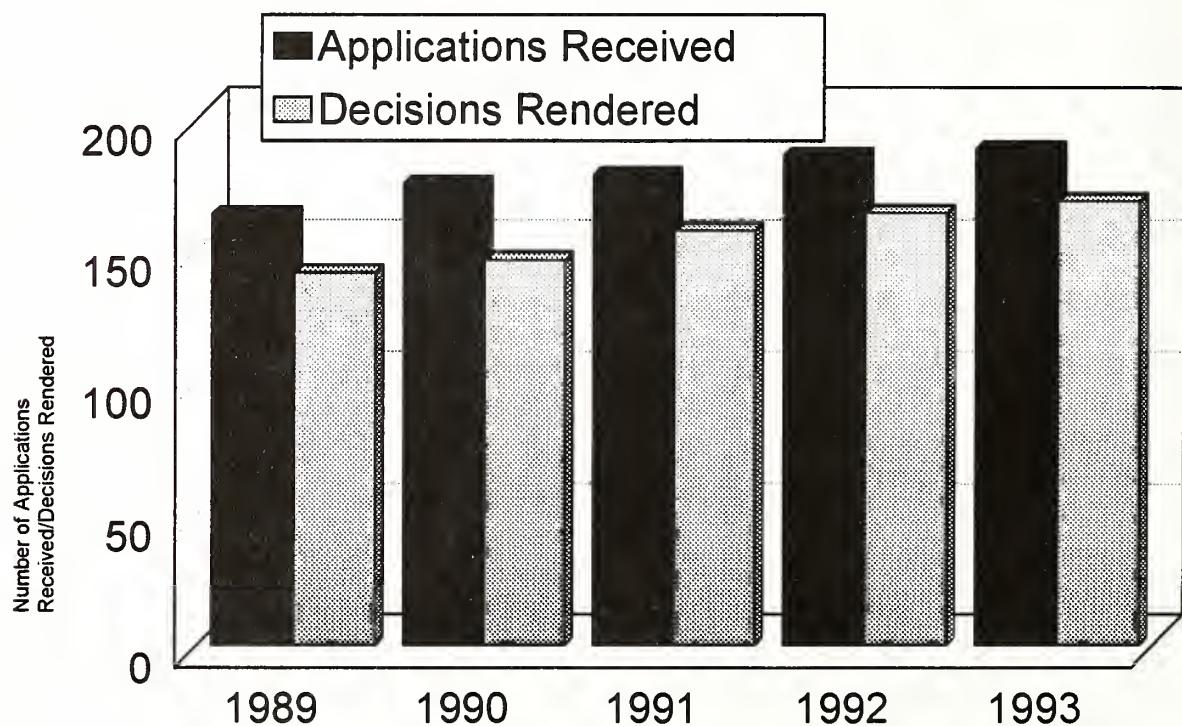
1989-1993



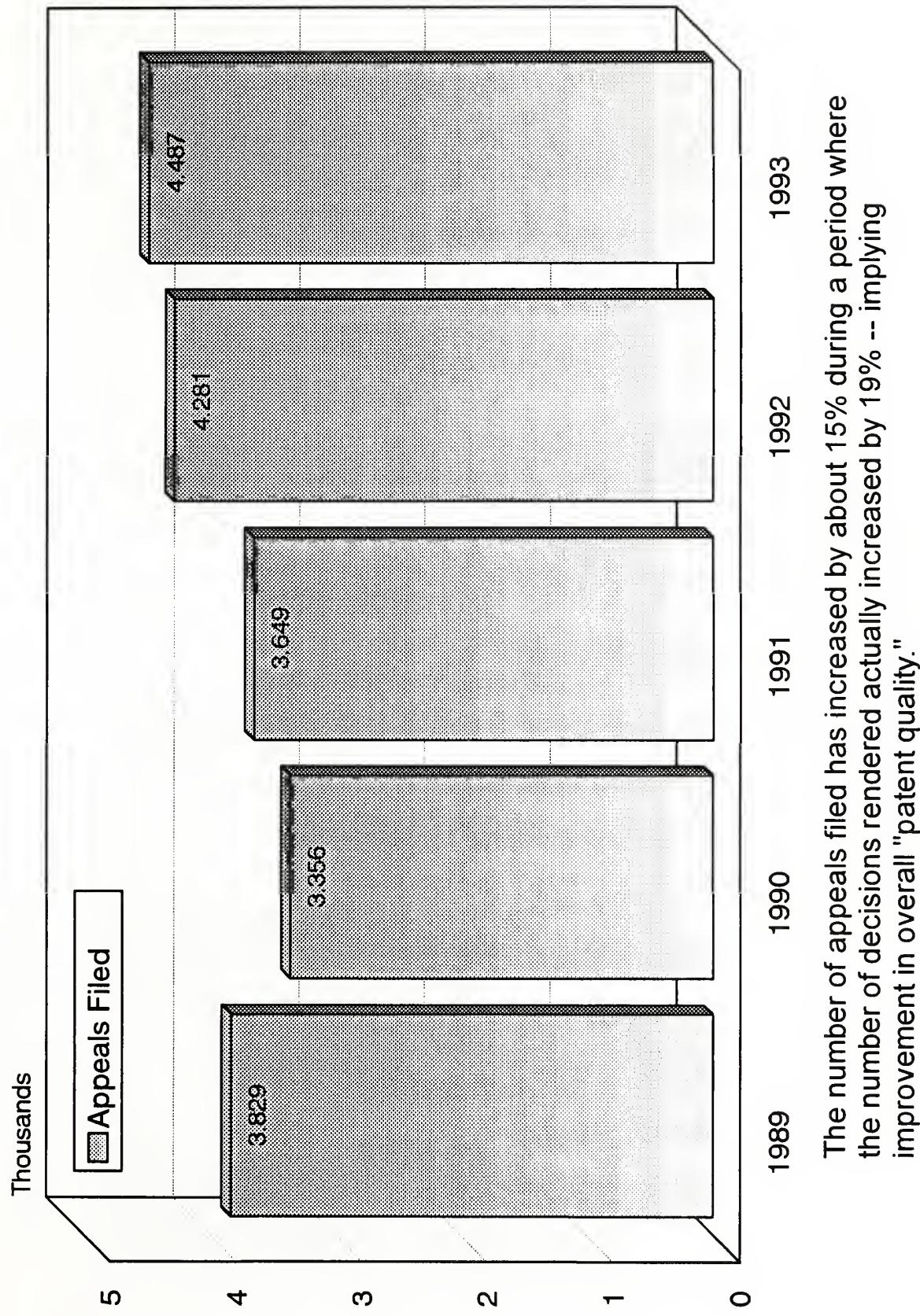
Patent pending has risen slightly in the period 1989-1993 -- by 6%, but during the same epoch, the number of applications received has risen by 15% in the period 1989-1993 and the number of decisions rendered has actually risen by 19%.

Patent Activity

1989-1993



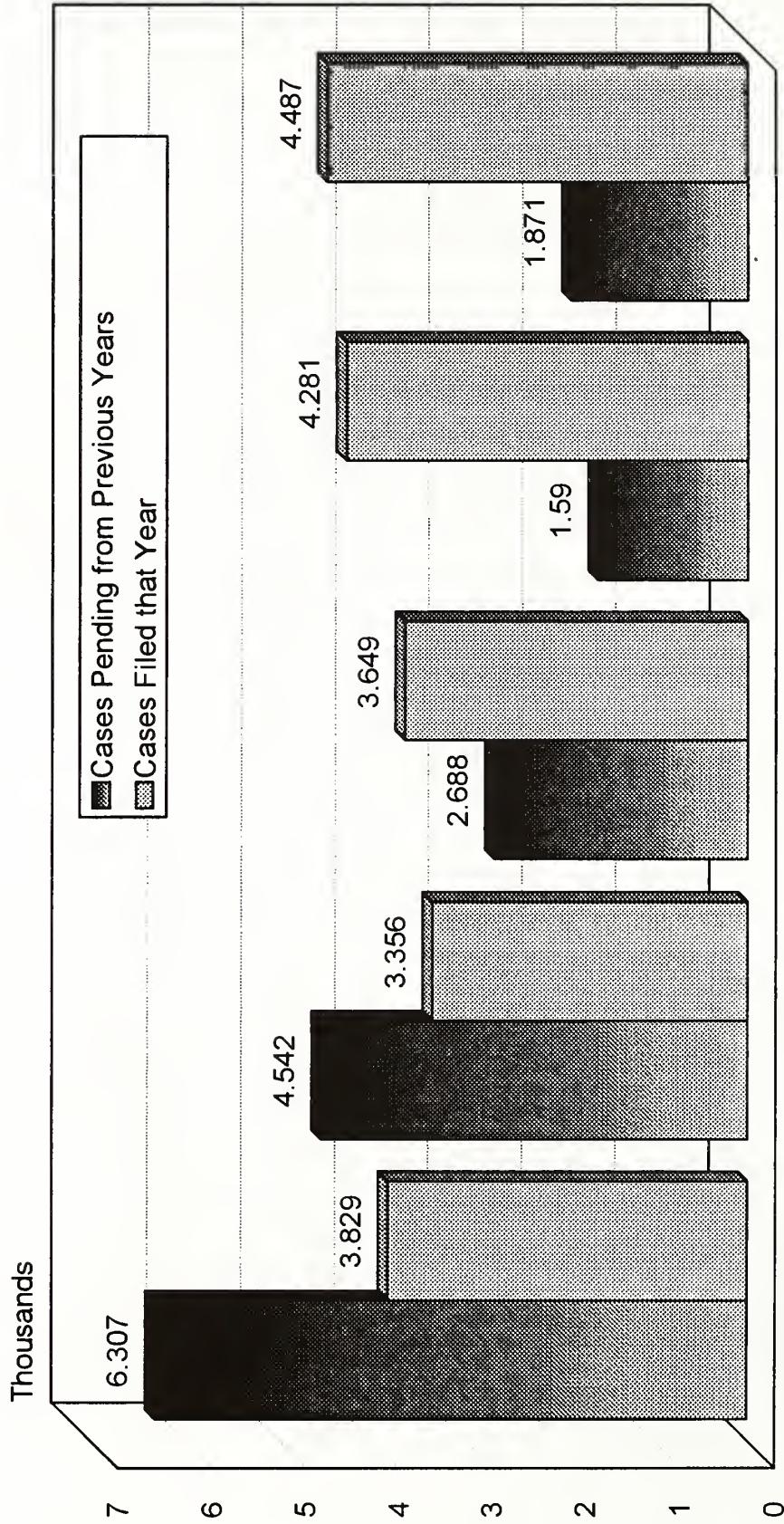
Appeals Cases Filed -- Annual Reports, Fiscal Years 1989-1993



The number of appeals filed has increased by about 15% during a period where the number of decisions rendered actually increased by 19% -- implying improvement in overall "patent quality."

Appeals Activity

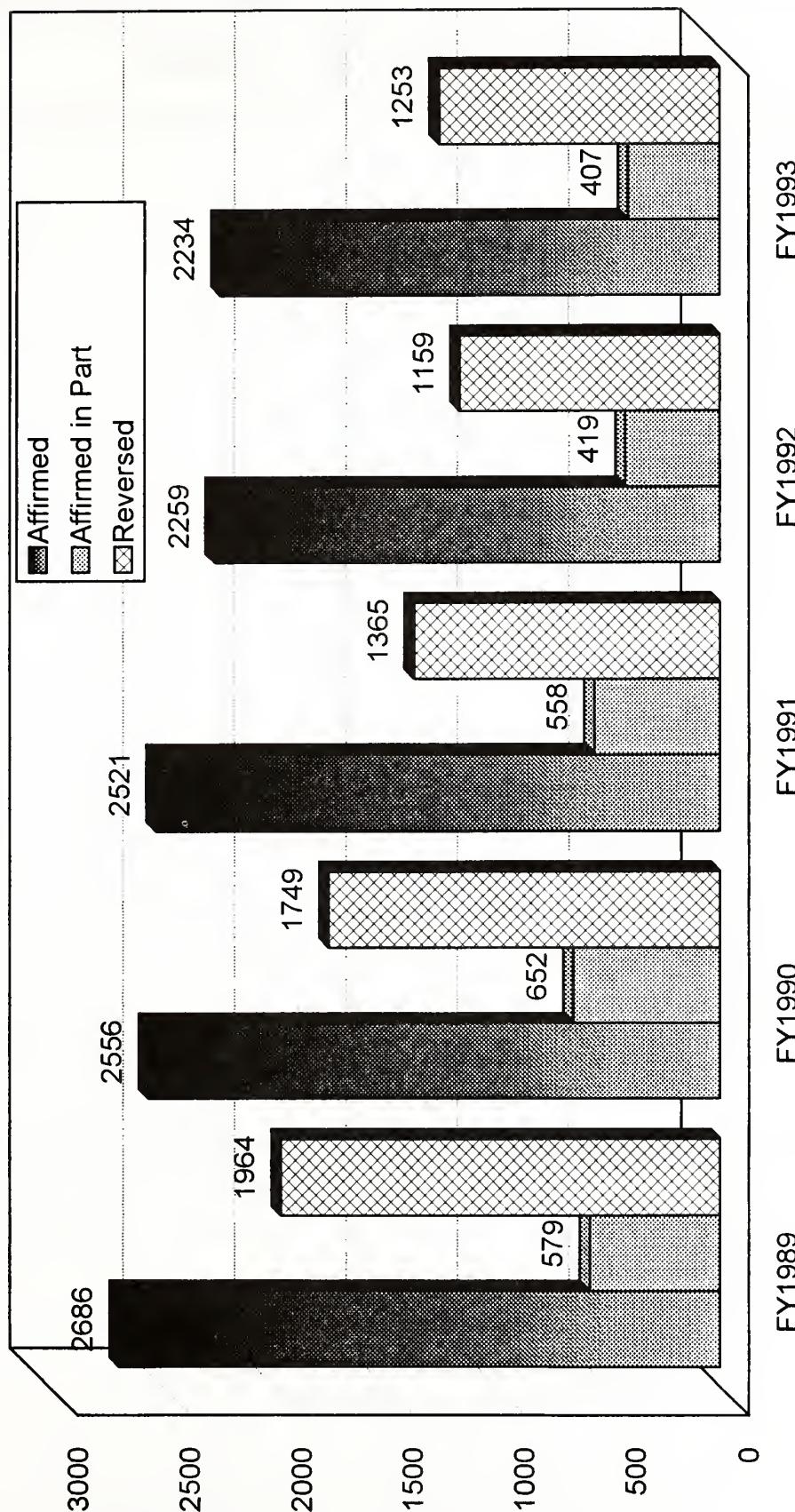
Number of Cases Pending FY1989-FY1993



- Number of appeals cases pending showed dramatic (positive) improvements during this epoch -- declining by 70%
- The number of appeal cases filed during this same period increased 15% at a time when the number of applications filed also increased by 15%.

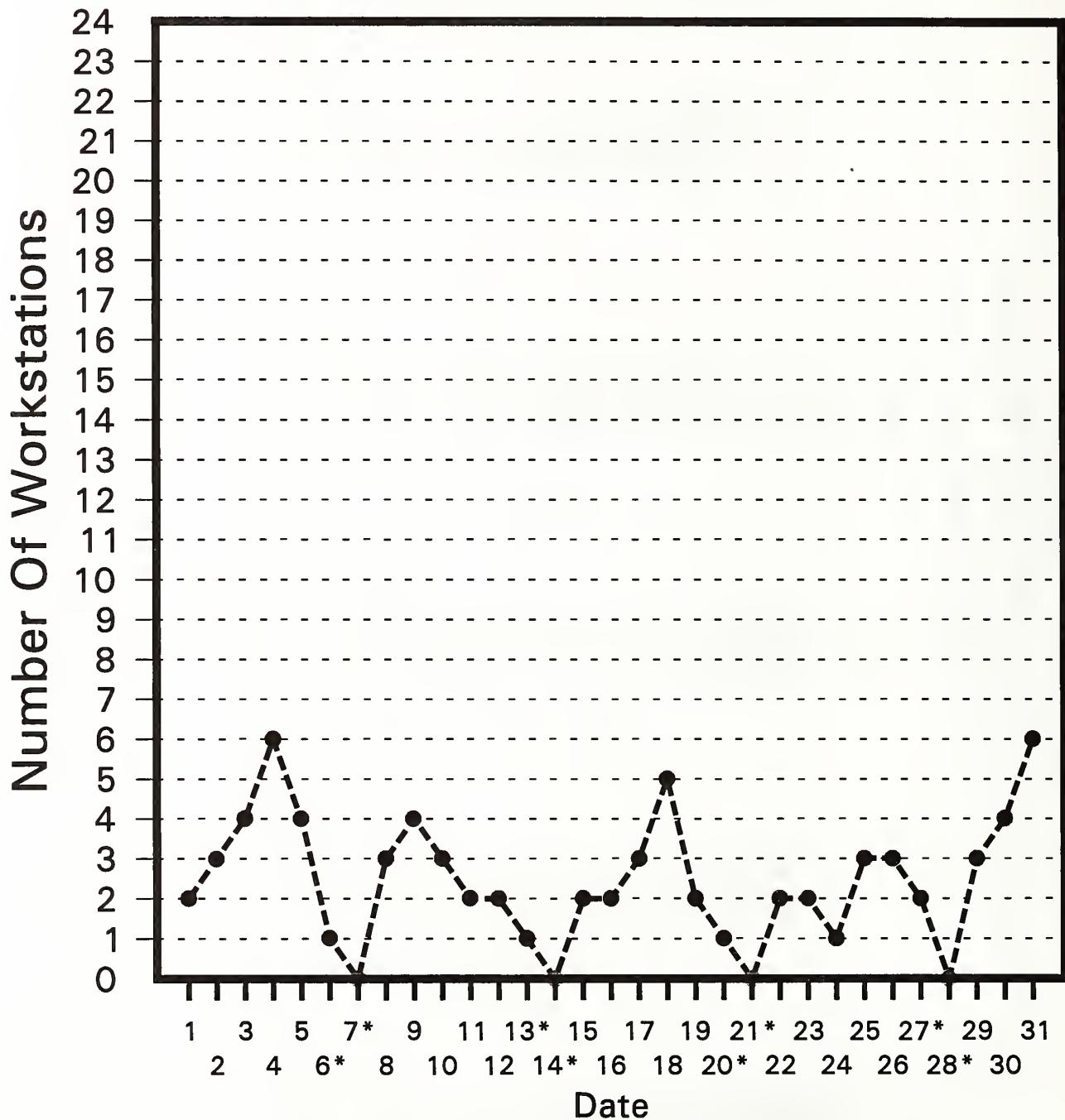
Appeals Activity

Number of Cases Affirmed or Reversed FY1989-FY1993



The affirmation rate has trended upward (positively) since 1989 -- 65% (1990); 70% (1991); 70% (1992); and, 68% (1993). During this same period, the age and experience level of examiners trended downward and their APS and other automated tool training opportunities were limited at best.

Workstation Activity In Group 1200 Clusters During August 1994

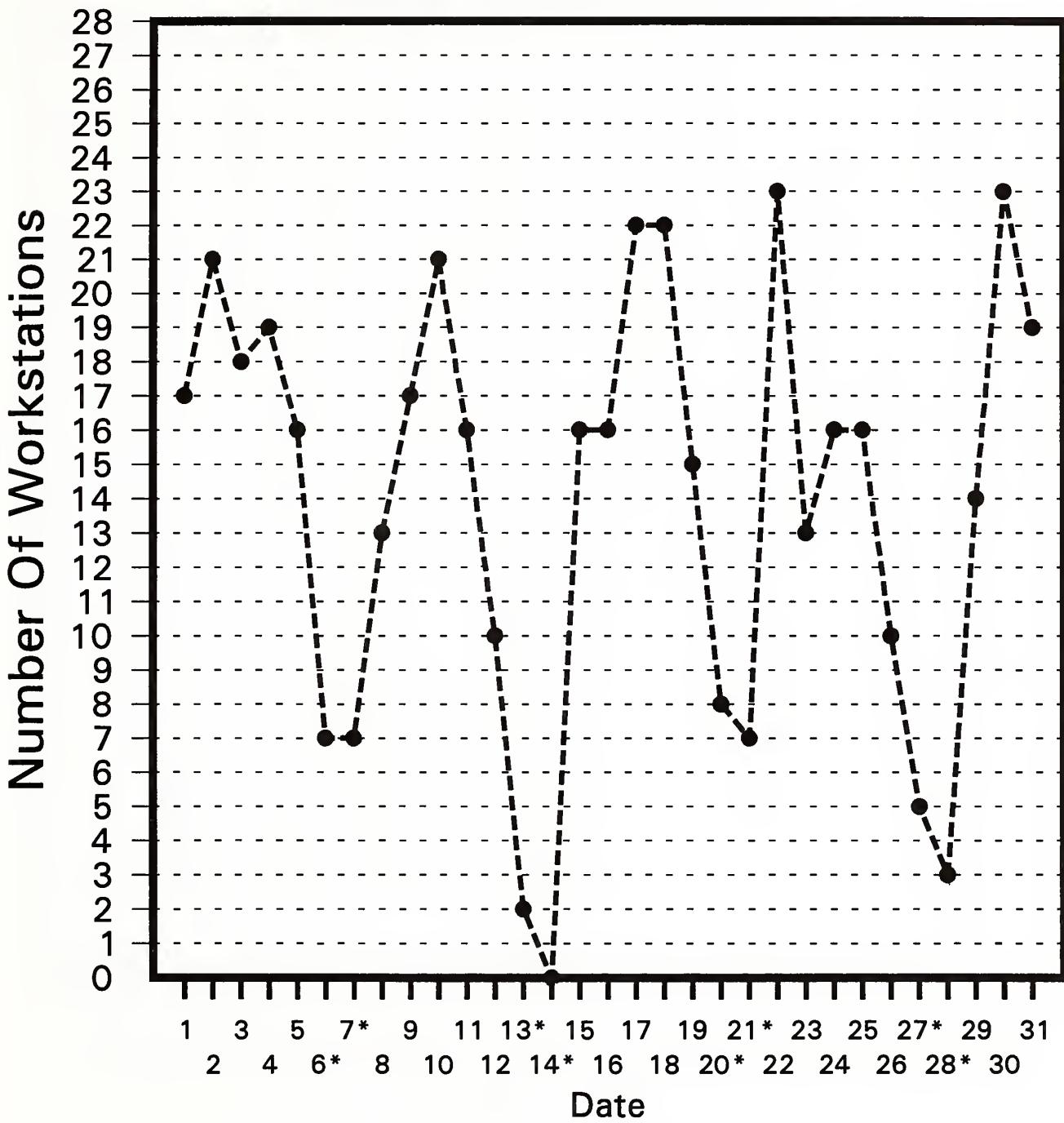


Maximum Workstations In Use
At One Time Each Day

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(Group 1200 has a total of 24 workstations)
(* is weekend day or holiday)

Workstation Activity In Group 2100 Clusters During August 1994

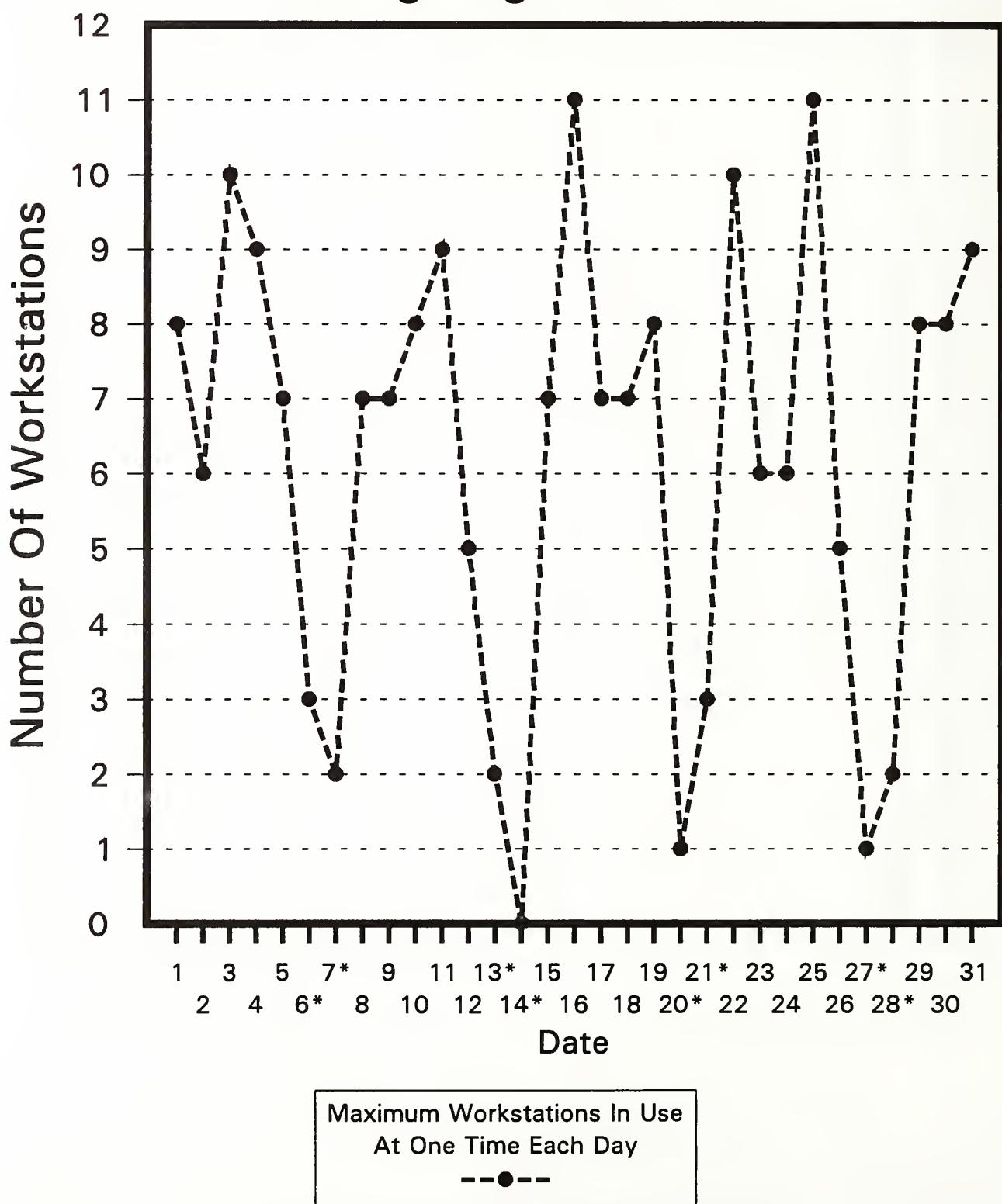


Maximum Workstations In Use
At One Time Each Day



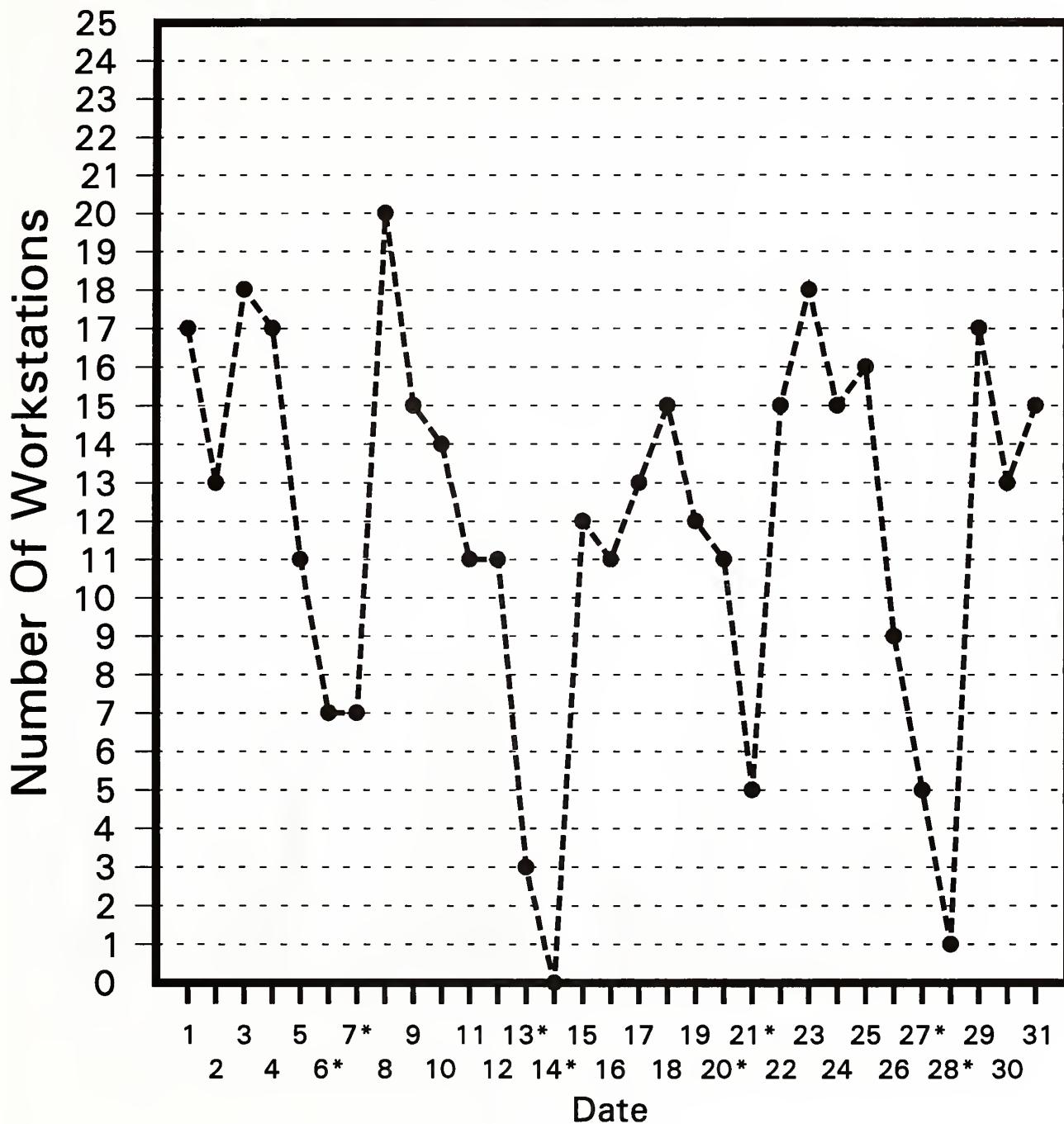
(Group 2100 has a total of 29 workstations)
(* is weekend day or holiday)

Workstation Activity In Group 2200 Clusters During August 1994



(Group 2200 has a total of 12 workstations)
(* is weekend day or holiday)

Workstation Activity In Group 2300 Clusters During August 1994

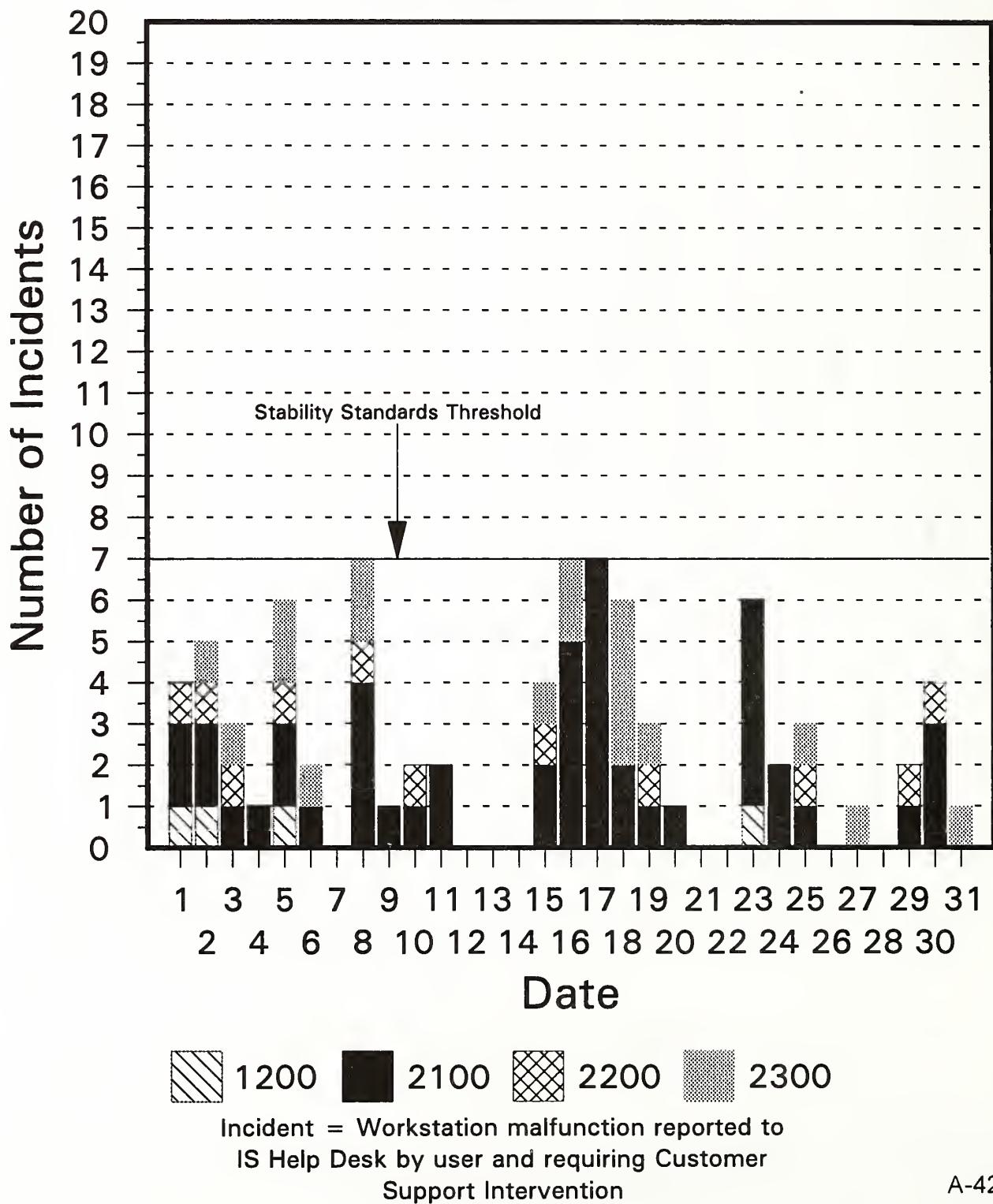


Maximum Workstations In Use
At One Time Each Day

---●---

(Group 2300 has a total of 25 workstations)
(* is weekend day or holiday)

Workstation Malfunctions In Groups 1200, 2100, 2200 and 2300 Clusters During August 1994



Problem Management System Reports

The Office of Computer and Telecommunications Operations (OCTO) uses the Info/Man problem tracking and management system to monitor the resolution of identified computer hardware and software problems, and to determine areas for improving service to our customers.

Problems are entered into the system via two means: PTO personnel calling the help desk, and PTO personnel who have direct access to the problem tracking system. Problems are classified into categories such as Messenger, CSIR, Group printers, office automation applications, microcomputers, TRAM, PALM, and PTOnet. The problem is assigned to the appropriate group for resolution. Many daily, weekly, and monthly reports are generated from the information that is captured in this system.

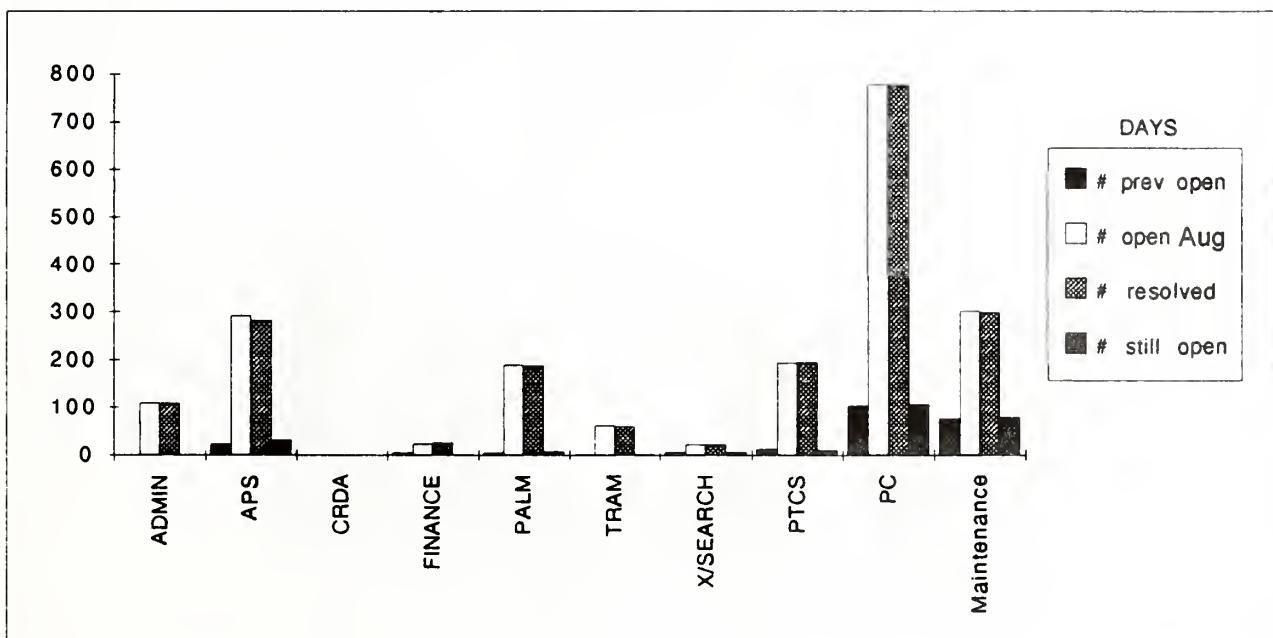
In keeping with recent customer focus group sessions, OCTO will continue to use this system to analyze support of previously agreed upon customer service standards in accordance with service agreements which will be in place by October 1, 1994. The following charts provide the current progress toward reaching this goal.

Figure ES-18 provides, by category, the total number of problems reported in August 1994, and those which were carried over from the previous month. There are two reported categories which require further explanation. The category labelled 'PC' provides counts of PC problems that are not related to an application. The 'Maintenance' category is the OCTO internal workload for keeping the systems updated and the hardware maintained.

Figure ES-19 provides a chart of the time required to resolve customer problems, reported by category.

Figure ES-20 provides the average time for resolution of problems, reported by category.

Figure ES-18
Problem Records by Category



Problem Management System Reports

Figure ES-19
Problem Resolution Response

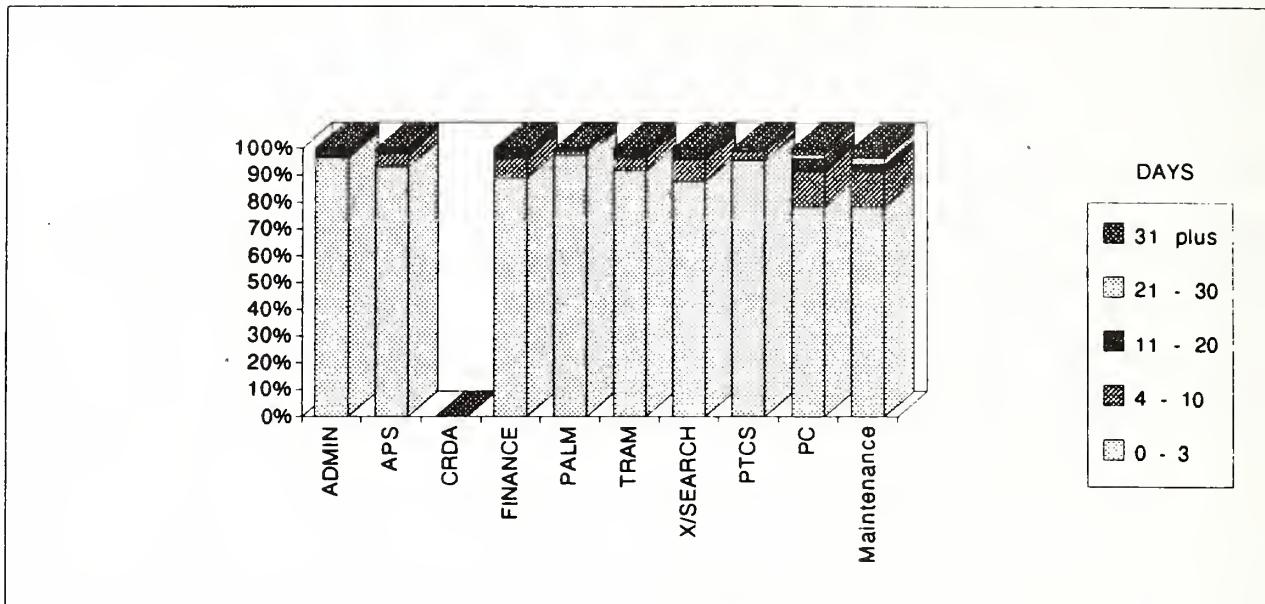
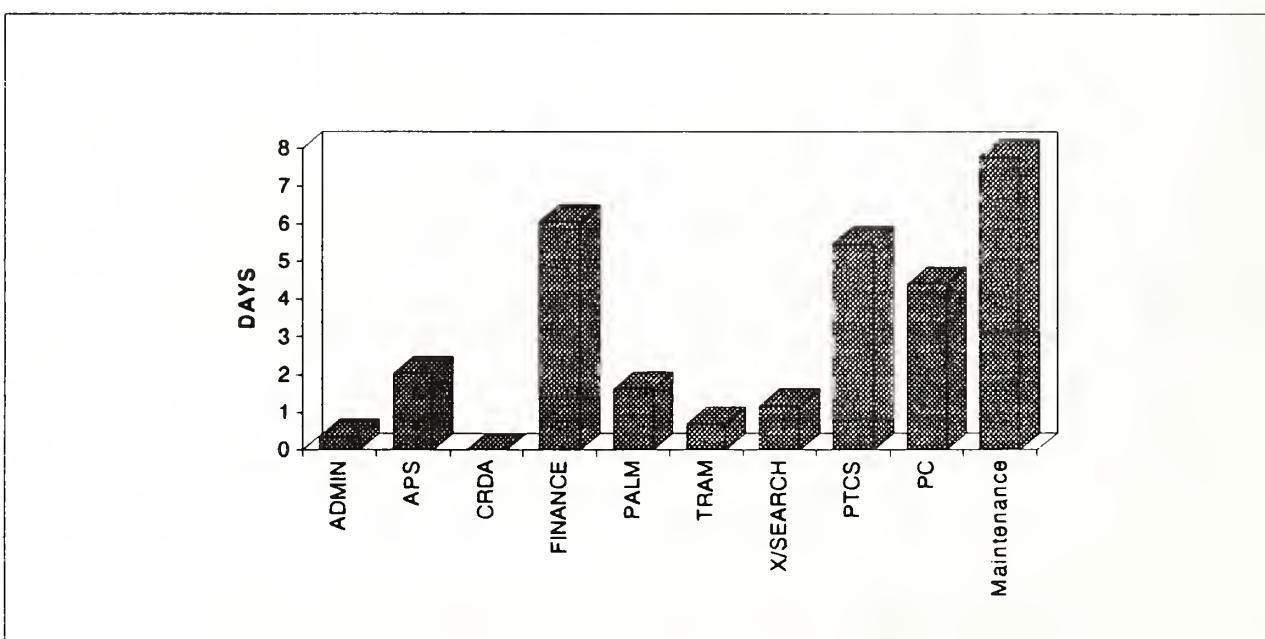


Figure ES-20
Average Resolution Time



Transaction Response Times for Search Applications

Selected monthly average response times for the PTO's search systems are shown below. The average response time for Messenger search transactions for the last 12 months was 21.8 seconds, compared to 18.2 for the previous 12 months. (See Figure ES-7). The values shown for Classified Search and Image Retrieval (CSIR) represent the average time required to retrieve an image page to the requesting workstation. The average response time for the last 12 months was 0.5 seconds compared to 0.8 for the previous 12 months. (See Figure ES-8). The average X-Search response time for the last 12 months was 7.0 seconds, compared to 8.4 for the previous 12 months. (See Figure ES-9).

Figure ES-7
Messenger Search Request
Monthly Average Response Time

Target: 80% of all search request transactions be completed in less than 30 seconds. Messenger response time in August 1994 was 24.2 seconds.

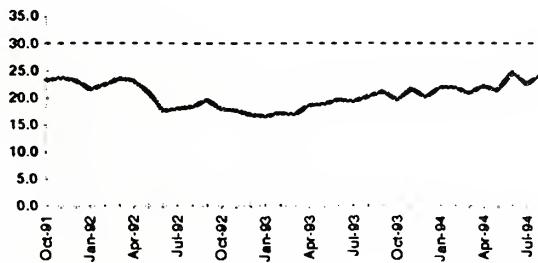


Figure ES-8
CSIR Image Page Retrieval
Monthly Average Response Time

Target: Average of all image page retrievals to be under 1 second. CSIR response time in August 1994 was 0.44 seconds.

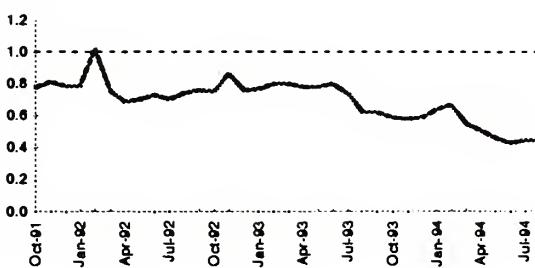
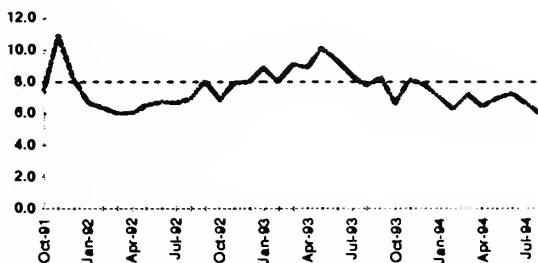


Figure ES-9
X-Search Internal Transaction
Monthly Average Response Time

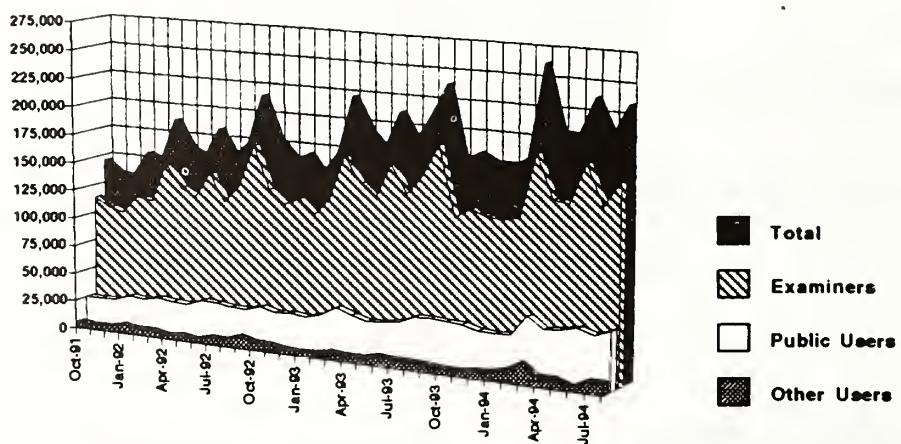
Target: 80% of all internal transactions to be under 8 seconds.
X-Search response time in August 1994 was 5.9 seconds.



Messenger Search Requests and Response Times

There were 2.3 million search requests processed by Messenger in FY93 which was 15% greater than FY92. During the last 12 months an average of 206,546 search transactions have been processed each month, compared to 187,620 for the previous 12 months, an increase of 10%. During this same period, Examiner usage was up by 6% and public usage up 26%. A peak of 262,566 search requests was reached in March 1994. In August 1994 the Examining Corps initiated 172,185 search requests, representing 74% of the total load. Public users, which include two PTO Public Search facilities and 14 Depository Libraries (PTDL's), initiated 51,013 requests or 22% of the total. The two Public Search facilities initiated 38,791 requests (17,318 at PSR and 21,473 at CM1) and the PTDL's initiated 12,222 requests. All other users accounted for 10,502 search requests. (See Figure 1-4).

Figure 1-4
Messenger Search Requests by User Group



The average response time for the last 12 months is 21.8 seconds per search request, compared to 18.2 for the previous 12 month period. Amdahl 6390-2 storage devices were installed in May 1992, accounting for the improved response times in Figure 1-5. Figure 1-6 shows the response time distribution for August 1994. The target for Messenger search response time is for at least 80% of all requests to complete in less than 30 seconds. 69% of all search requests for August completed in less than 10 seconds, and a total of 83% were completed in less than 30 seconds.

Figure 1-5
Messenger Search Requests and Response Times for All Users

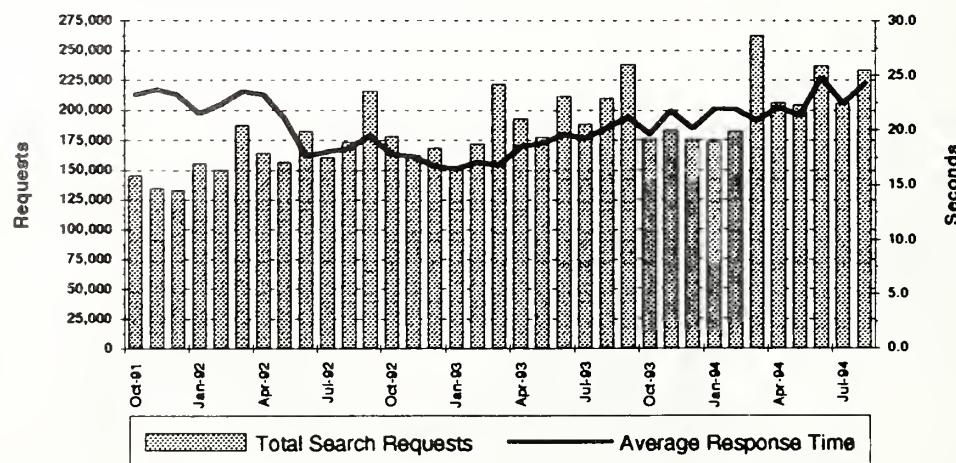
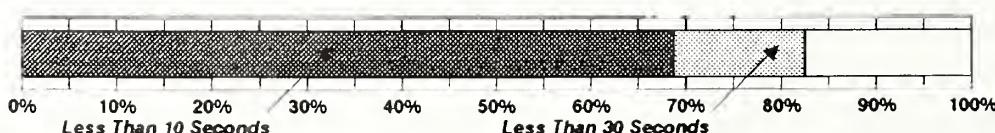


Figure 1-6
Messenger Search Request Response Time Distribution - August 1994

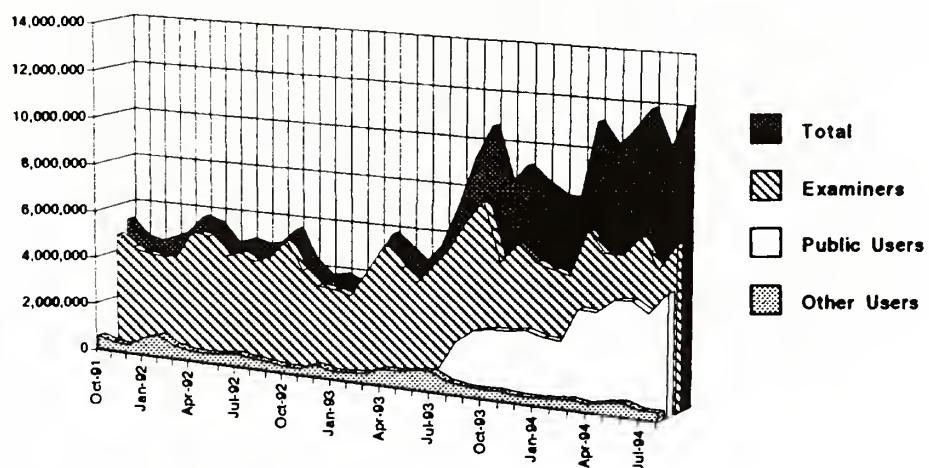


69% of All Requests Under 10 Seconds;
83% Under 30 Seconds

CSIR Image Page Retrievals and Response Times

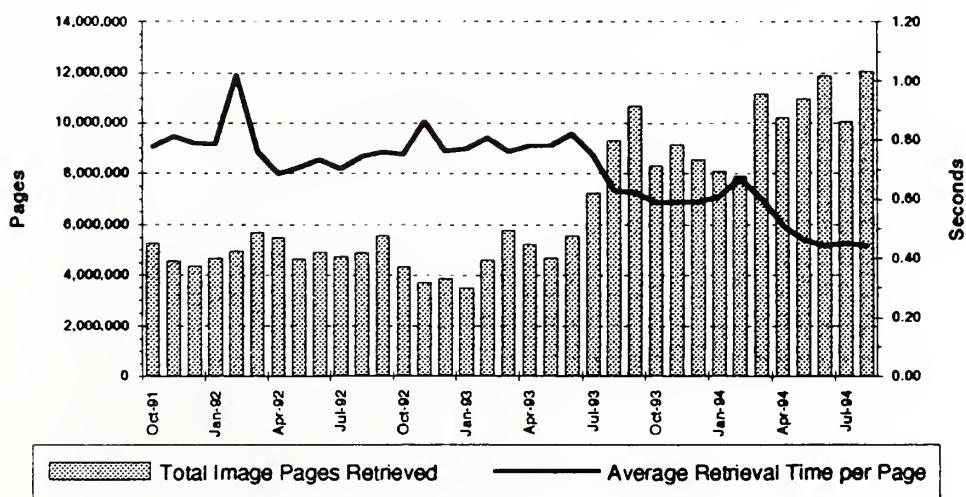
During the last twelve months an average of 9.9 million image pages have been retrieved to CSIR workstations each month. Examiners currently account for 61% of all image pages retrieved, averaging 6.1 million pages each month over the last twelve months. The cumulative number of image pages retrieved by examiners in FY93 was 68.5 million which was 28% greater than FY92. A comparison of the last 12 months against the previous 12 months shows a 88% increase in pages retrieved by all users and an increase of 34% by examiners. A Public Image Search Facility was installed in July 1993, providing public access to CSIR. Group 120 workstations were also installed during the same period, resulting in a significant increase in the number of pages retrieved. In August 1994 there were 6,740,811 image pages retrieved by examiners, 4,927,129 pages retrieved by public users, and 392,422 pages retrieved by all other users.

Figure 2-5
Image Pages Retrieved by User Group



The target response time for image page retrievals is for the retrieval of each page to be completed in less than 1 second. Figure 2-6 shows the monthly average for the last 12 months was 0.55 seconds. In February 1992 the average retrieval response time reached a peak of 1.02 seconds. The average response time for August 1994 was 0.44 seconds per page.

Figure 2-6
Image Page Retrievals and Response Times for All Users

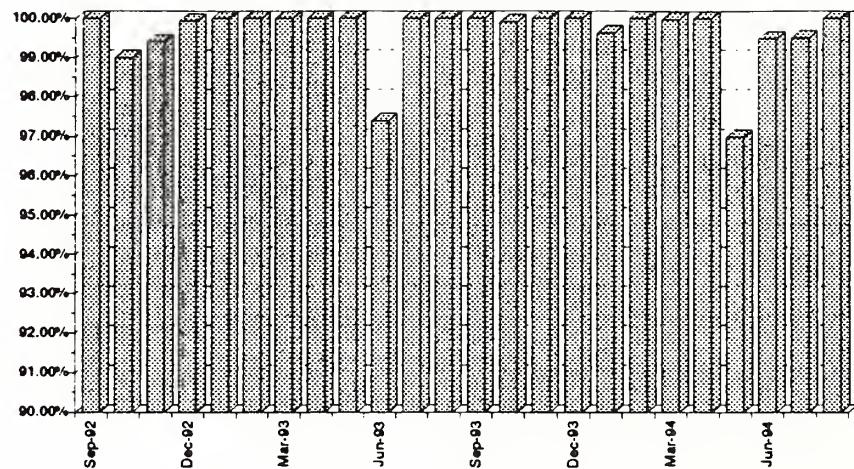


Messenger Availability

Figure 4-1 shows Messenger availability for the last 24 months. The cumulative Messenger availability for the most recent 12 month period was 99.7%. The cumulative availability for the previous 12 month period was 99.7%.

There were no incidents which affected availability of Messenger in August 1994.

Figure 4-1
Messenger Availability During Scheduled Operational Hours

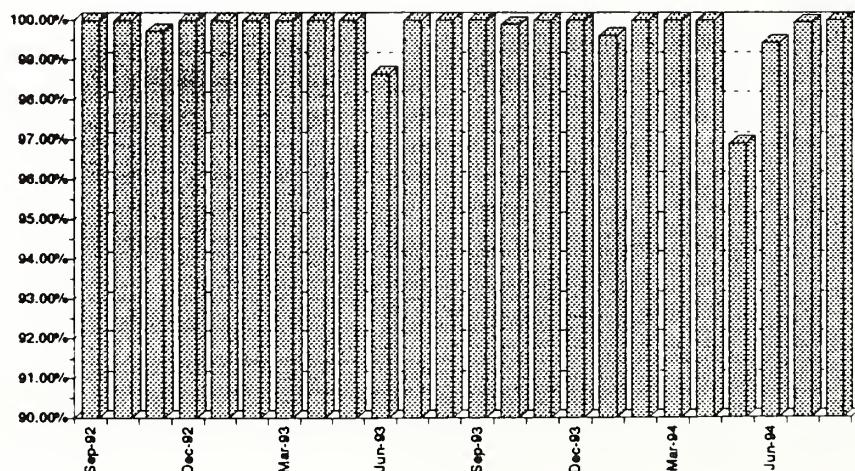


CSIR Availability

Figure 4-2 shows CSIR availability for the last 24 months. The cumulative CSIR availability for the most recent 12 month period was 99.7%. The cumulative availability for the previous 12 month period was 99.9%.

There were no incidents which affected availability of CSIR in August 1994.

Figure 4-2
CSIR Availability During Scheduled Operational Hours



PTOnet Outages Overview

PTOnet is a comprehensive end-to-end data transmission facility linking all computers in the PTO, from the largest mainframes to the smallest intelligent terminals. PTOnet comprises--

A local area network (LAN)

Currently connects 13 buildings in Crystal City, providing networking services to approximately 4,000 customers.

The LAN is divided or partitioned into smaller segments (101 segments as of August 1994) to lessen the impact of PTOnet problems upon the entire PTO if a segment should fail. That is, only those customers attached to a segment will be impacted if problems occur; the remainder of the PTO may continue to work as if nothing has happened.

Communications devices attached to the network

Synoptic hubs, like the hub of a wagon wheel, allow network traffic to pass through to other parts of the network. If a hub experiences problems, more than one segment may be affected.

Routers, as the name implies, route or direct network traffic from one part of the network to another. If a router experiences problems, then more than one segment may be affected.

Network Servers are used as a repository for software applications that can be shared by customers on the network. Servers also do a security check of the customers that request access to the network.

Application gateways connect customers to remote locations for access to commercial databases, the Federal Financial System (FFS), the National Finance Center (NFC), and internal PTO computers. If a gateway experiences problems, then any customer requiring access to the application would find it unavailable. However, all of the other services on the network would still be available to the customer.

User drops are the individual outlets in each customer's office that enable the customer to connect their computer to PTOnet.

Network services such as office automation (e.g., word processing, electronic mail) and access to mainframe applications.

PTOnet is monitored in real time throughout the business day. When network problems are detected, action is taken and response personnel may be dispatched to the problem area for follow-up action.

PTOnet Outages - August '94

Segments: (A segment is the partitioning of the network wiring to accommodate groups of users.
There were 101 network segments in production in August)

<u>Device Down</u>	<u>Building</u>	<u>Floor</u>	<u># Network Segments down</u>	<u>Possible # of Users Affected</u>	<u>Hardware Hrs Down</u>	<u>Possible User hours lost</u>
Fiber Optic Cable	CP3	All floors	3.00	271	0.75	203.25
Root Cabletron Hub	CPK2	1 1	1.00	50	0.50	25.00
Synoptics Hub	CM1	1	1.00	10	1.00	10.00
Synoptics Hub	CP3	2	0.33	20	0.50	10.00
Synoptics Hub	CP3	3	0.33	13	0.50	6.50
Synoptics Hub	CP3	4	0.33	20	0.50	10.00
Synoptics Hub	CP3	5	0.33	26	0.50	13.00
Synoptics Hub	CP3	6	0.33	18	0.50	9.00
Synoptics Hub	CP4	5	0.33	29	0.50	14.50
Synoptics Hub	CP3	7	0.33	40	0.75	30.00
Synoptics Hub	CPK2	1 0	0.50	75	0.25	18.75
Synoptics Hub	CPK1	8	0.20	43	0.50	21.50
Server - PTO3	CP4	N/A		150	1.50	225.00
Server - PTO11	CP2	N/A		150	0.50	75.00
Server - PTO12	CP3	N/A		150	5.00	750.00
Server - PTO15	CP3	N/A		150	5.50	825.00
Server - PTO17	CPK1	N/A		150	1.50	225.00
Server - XSEARCH1	ST	N/A		150	5.00	750.00
TOTAL HOURS DOWN					25.75	3221.50

Applications:

<u>Device Down</u>	<u>Building</u>	<u>Floor</u>	<u>Application down</u>	<u>Possible # of Users Affected</u>	<u>Hardware Hrs Down</u>	<u>Possible User Hrs Lost</u>
* NFC Gateway	PK2/3	1 1	NFC	35	4.00	140.00
* FFS Gateway	PK2/3	1 1	FFS	35	5.00	175.00
FFS Gateway	PK2/3	1 1	FFS	35	0.50	17.50
FFS Gateway	PK2/3	1 1	FFS	35	0.50	17.50
FFS Gateway	PK2/3	1 1	FFS	35	0.50	17.50
SAA-Amdahl	PK2/3	1 1	SAA	35	0.25	8.75
TOTAL HOURS DOWN					10.75	376.25

* (Leased AT&T line down)

Individual User Outages:

<u>Device Down</u>	<u>Building</u>	<u>Floor</u>	<u>Possible # of Users Affected</u>	<u>Production Hours Down</u>	
User Drop	PK3/4	4	1	2.50	
TOTAL HOURS DOWN					2.50

Appendix E

Statistical Analyses Derived from Survey

ERROR FOR APS SAMPLE AND EXPLANATION OF CALCULATIONS

The error rate for the APS sample is ± 2.9 percent, using a 95 percent confidence standard. This figure is based on 724 completed surveys on a total population of 2028 supervisory and regular patent examiners. The rate is calculated by using two formulas.

The first formula is $n_c = \frac{n_a}{1 - \frac{n_a}{N}}$

- N is the actual population. In this instance, it is 2028.
- n_a is the sample surveyed, in this instance, 724.
- n_c gives the sample size for an infinite population that equates to sampling 724 out of a population of 2028.

The formula adjusts the sample based on the population size. It is necessary because the formula for calculating error rates is based on an infinite population. We know that error rates are lower for a finite population versus an infinite population. For example, for an infinite population, a sample size of 2028 yields an error rate of ± 2.1 percent. However, the *entire* patent examiner population is 2028. If we were to sample 2028 patent examiners, the error rate would be zero, lower than the rate given by the second formula. Error rates must be always be adjusted to account for a smaller than infinite sample. (If the population is large, the adjustment produces only a minor difference.)

The second formula is $E^2 = \frac{Z^2\pi(1-\pi)}{n_c}$

- n_c is the adjusted sample size that was calculated in the first formula.
- z is 1.96 for the 95% confidence level.
- π is a percentage between zero and 100 percent (0-1.00) It is unknown, but 50 percent is used to give the most conservative estimate of error rate. $\pi(1 - \pi)$ is highest when $\pi=0.50$; this gives the highest possible error rate estimate. When $\pi=0.50$, $\pi(1 - \pi)=(0.50)(1.00 - 0.50)=(0.50)(0.50)=0.25$. Any other combination yields a smaller number and therefore a lower error rate (e.g., $0.40 \times 0.60=0.24$; $0.30 \times 0.70=0.21$; or $0.25 \times 0.75=0.19$).
- E is the calculated error rate.

The formula calculates the error rate based on the adjusted sample size. As sample size goes up, the error rate goes down. The other two variables (z, π) can be explained as follows:

z depends on the confidence level, which is set by the researcher: 95 percent confidence is a standard. It is a measure of the amount of certainty needed in measurements. The higher the confidence level set the more certainty needed; therefore, the higher the z and the higher the margin of error.

π depends on survey results. It represents a percentage of the total sample; therefore, it is always between zero and one, or 100 percent. It is the percentage of the sample that gives a certain response. For example, if the question is a yes/no question and 40 percent of respondents answer "yes", π is 0.40. Since we have many questions and many possible combinations of responses, 50 percent is used to give the most conservative (highest) estimate of the maximum error rate. Using 0.50 is also more reliable since as π or $1 - \pi$ approaches zero, the formula becomes less accurate.

**APS USER CENSUS NOV 1994 -
FREQUENCY DISTRIBUTION REPORT**

QUESTION 1a - 1u

	Satisfied	Dissatisfied	Important	Unimportant
a. The initial training you received on how to use the computer resources available to you	80.00	20.00	94.00	6.00
b. The refresher/update training you have received on how to use the computer resources currently available to you	51.00	49.00	92.00	8.00
c. The documentation and reference materials needed to use the equipment, systems, and databases currently available to you	72.00	28.00	92.00	8.00
d. Your access (hook up) to APS and other databases	66.00	34.00	96.00	4.00
e. Availability and maintenance of terminals, PCs and CRTs to do your job	70.00	30.00	98.00	2.00
f. Availability of printers needed to do your job	63.00	37.00	98.00	2.00
g. Overall cleanliness in the shared facility workspace	77.00	23.00	77.00	23.00
h. Overall lighting in the shared facility workspace	88.00	12.00	89.00	11.00
i. Overall climate control in the shared facility	72.00	28.00	89.00	11.00
j. Effectiveness of the Help Desk in resolving equipment problems or systems problems you encounter in the course of doing your job	82.00	18.00	97.00	3.00
k. Availability of someone who can help get you through some of the more difficult or obscure situations that sometimes arise with APS	64.00	36.00	93.00	7.00

	Satisfied	Dissatisfied	Important	Unimportant
I. Effectiveness of the PTO newsletter in keeping you informed about system changes, new features, and how to use them	81.00	19.00	83.00	17.00
m. Opportunities for swapping information among colleagues about search methods and techniques	66.00	34.00	84.00	16.00
n. Accuracy and reliability of the classification system within your art area in order to get the proper hits	73.00	27.00	96.00	4.00
o. Hours of operation of APS and the walk-up printers	84.00	16.00	97.00	3.00
p. Overall reliability of APS and its supporting networks	82.00	18.00	98.00	2.00
q. Overall user-friendliness (ease of operations of APS)	72.00	28.00	97.00	3.00
r. Customization of APS to the needs of your examining group	57.00	43.00	89.00	11.00
s. Availability of a channel for submitting systems-related suggestions for improvement	53.00	47.00	88.00	12.00
t. Feedback on suggestions submitted	56.00	44.00	88.00	12.00
u. Reliable information about system changes and enhancements scheduled for implementation	64.00	36.00	92.00	8.00

Question 2a-f

2. Have you received initial training in any of the following areas--and if so, what year?

- a. Search strategies and methods for your art area
- b. Text search on APS
- c. Image retrieval on an image workstation
- d. Use of one or more commercial databases (consider the one most important to you)
- e. WinCom/WinNet
- f. Other

Question 4a-f

4. How much of your initial training do you still remember?

- a. Search strategies and methods for your art area
- b. Text search on APS
- c. Image retrieval on an image workstation
- d. Use of one or more commercial databases (consider the one most important to you)
- e. WinCom/WinNet
- f. Other

Question 5a-f

- 3. How would you rate the adequacy of your initial training, in each of the following areas?
 - a. Search strategies and methods for your art area
 - b. Text search on APS
 - c. Image retrieval on an image workstation
 - d. Use of one or more commercial databases (consider the one most important to you)
 - e. WinCom/WinNet
 - f. Other
- 5. Have you received refresher/update training in any of the following areas
 - a. Search strategies and methods for your art area
 - b. Text search on APS
 - c. Image retrieval on an image workstation
 - d. Use of one or more commercial databases (consider the one most important to you)
 - e. WinCom/WinNet
 - f. Other

Question 3a-f

- 3. How would you rate the adequacy of your initial training, in each of the following areas?
 - a. Search strategies and methods for your art area
 - b. Text search on APS
 - c. Image retrieval on an image workstation
 - d. Use of one or more commercial databases (consider the one most important to you)
 - e. WinCom/WinNet
 - f. Other
- 5. Have you received refresher/update training in any of the following areas
 - a. Search strategies and methods for your art area
 - b. Text search on APS
 - c. Image retrieval on an image workstation
 - d. Use of one or more commercial databases (consider the one most important to you)
 - e. WinCom/WinNet
 - f. Other

Question 6a-f				Question 7a-f			
6. How would you rate the adequacy of your refresher/update training, in each of the following areas?	adequate	inadequate		7. How would you rate the adequacy of documentation and reference materials in each of the following areas?		adequate	inadequate
a. Search strategies and methods for your art area	62.00	38.00		a. Search strategies and methods for your art area	42.00	58.00	
b. Text search on APS	65.00	35.00		b. Text search on APS	68.00	32.00	
c. Image retrieval on an image workstation	46.00	54.00		c. Image retrieval on an image workstation	54.00	46.00	
d. Use of one or more commercial databases (consider the one most important to you)	76.00	24.00		d. Use of one or more commercial databases (consider the one most important to you)	61.00	39.00	
e. WinCom/WinNet	40.00	60.00		e. WinCom/WinNet	42.00	58.00	
f. Other	61.00	39.00		f. Other	59.00	41.00	
Question 8			satisfied	dissatisfied			
How satisfied are you that you have the training and skills needed to fully utilize the information resources available to you?	54.00	46.00					
			use frequently	use infrequently			
Question 9a-k							
9. How would you describe your level of usage of the following PTO research channels?							
a. The shoes	81.00	19.00		g. Commercial databases through my desktop PC	16.00	84.00	
b. Text search through a shared, single screen text terminal	24.00	76.00		h. Library reference volumes (journal articles, foreign patients, etc.)	18.00	. 82.00	
c. Text search through an image workstation	20.00	80.00		i. Walk-up printers	48.00	52.00	
d. Text search through my desktop PC	44.00	56.00		j. Printers in the shared facility workspace	56.00	44.00	
e. Image search at an image workstation	27.00	73.00		k. Printer at or near my desktop	38.00	62.00	
f. Commercial databases at a special center (or a shared facility workspace)	7.00	93.00					

Question 10	Do you have access to the shoes in the course of performing your job?	<i>yes</i>	<i>no</i>	
Question 11	How would you describe your amount of usage of the shoes during the past three months?	98.00	2.00	
	heavy usage	<i>light usage</i>		
Question 12	<i>How satisfied are you with the following aspects of the shoes?</i>			
a.	Need to travel or move around to get the material you need	76.00	24.00	93.00 7.00
b.	Overall cleanliness and ease of working in the shoe area	67.00	33.00	91.00 9.00
c.	File integrity (completeness of expected items)	66.00	34.00	99.00 1.00
d.	Speed with which you can search the shoes and locate needed material	72.00	28.00	99.00 1.00
	complete	<i>very little fulfillment</i>		
Question 13	To what extent do the shoes fulfill the information needs of your job?	92.00	7.00	
	<i>yes</i>	<i>no</i>		
Question 14	Do you have access to text search through a shared, single-screen text terminal?	73.00	27.00	
	heavy usage	<i>light usage</i>		
Question 15	How would you describe your amount of usage of text search through a text terminal during the past three months?	35.00	65.00	
	<i>yes</i>	<i>no</i>		
Question 16	<i>How satisfied are you with the following aspects of text search through a shared text terminal?</i>			
a.	Accessibility of the shared text terminal equipment to your work area	82.00	18.00	92.00 8.00
b.	Availability of shared text terminal equipment when you need to use it	79.00	21.00	94.00 6.00

	satisfied	dissatisfied	important	not important
c. Operability and maintenance of printers in the shared text terminal area	61.00	39.00	95.00	5.00
d. Operability and maintenance of printers in the shared text terminal area	47.00	53.00	94.00	6.00
e. Log on/connect time required to initiate text search through a shared text terminal	74.00	26.00	90.00	10.00
f. System response time required to execute a search while doing text search through a shared text terminal	57.00	43.00	96.00	4.00
g. System response time required to go screen-to-screen or patent-to-patent while using a shared text terminal	71.00	29.00	93.00	7.00
h. Overall user-friendliness (ease of operation) involved in using a shared text terminal	72.00	28.00	96.00	4.00
i. System recoverability (ability to save work following a system crash, lock-up or boot-off) while using a shared text terminal	63.00	37.00	93.00	7.00
Question 17	<i>complete fulfillment</i>	<i>little fulfillment</i>		
To what extent does text search through a shared text terminal fulfill the information needs of your job?	51.00	49.00		
Question 18	<i>yes</i>	<i>no</i>		
Do you have access to text search through an image workstation?	22.00	78.00		
Question 19	<i>heavy usage</i>	<i>light usage</i>		
How would you describe your amount of usage of text search through an image workstation during the past three months?	57.00	43.00		
Question 20				
<i>How satisfied are you with the following aspects of text search through an image workstation?</i>	satisfied	dissatisfied	important	not important
a. Accessibility of the image workstation to your work area	93.00	7.00	97.00	3.00

	satisfied	dissatisfied	important	not important
b. Availability of image workstation equipment when you need to use it	91.00	9.00	98.00	2.00
c. Operability and maintenance of terminals and CRTs in the image workstation area	71.00	29.00	99.00	1.00
d. Operability and maintenance of printers in the image workstation area	79.00	21.00	98.00	2.00
e. Log on/connect time required to initiate text search through an image workstation	39.00	61.00	98.00	2.00
f. System response time required to execute a search while doing text search through an image workstation	43.00	57.00	98.00	2.00
g. System response time required to go screen-to-screen or patent-to-patent while doing text search through an image workstation	56.00	44.00	100.00	0.00
h. Overall user-friendliness (ease of operation) involved in doing text search through an image workstation	76.00	24.00	98.00	2.00
i. System recoverability (ability to save work following a system crash, lock-up or boot-off) while doing text search through an image workstation	45.00	55.00	98.00	2.00
	<i>complete fulfillment</i>	<i>very little fulfillment</i>		
Question 21				
To what extent does text search through an image workstation fulfill the information needs of your job?	75.00	26.00		
	<i>yes one PC</i>	<i>yes, more than one PC</i>	<i>No</i>	
Question 22				
Do you have a PC on or near your desktop?	93.00	5.00	2.00	
Question 23	286	386	486	MAC
What kind of PC is it?	5.00	93.00	2.00	0.70
Question 24				
Is your PC currently hooked up to APS text?	52.00	39.00	9.00	

	<i>Yes WinCom</i>	<i>Yes WinNet</i>	<i>No none of the above</i>	<i>Not sure</i>
Question 25 Is your PC currently using WinCom or WinNet	14.00	46.00	16.00	24.00
Question 26 Is your PC hooked up to a working printer somewhere in your local work area?	yes	no		
Question 27 <i>How satisfied are you with the following aspects of text search through your desktop PC?</i>	<i>satisfied</i>	<i>dissatisfied</i>	<i>important</i>	<i>not important</i>
a. Log on/connect time required to initiate a text search through your desktop PC	81.00	19.00	92.00	8.00
b. System response time required to execute a search while doing text search through your desktop PC	71.00	29.00	97.00	3.00
c. System response time required to go screen-to-screen or point-to-point while doing text search through your desktop PC	81.00	19.00	95.00	5.00
d. Overall user-friendliness (ease of operation) involved in doing text search through your desktop PC	81.00	19.00	97.00	3.00
e. System recoverability (ability to save work following a system crash, lock-up or boot-off) while doing text search through your desktop PC	69.00	31.00	95.00	5.00
Question 28 To what extent does text search through your desktop PC fulfill the information requirements of your job?	<i>Complete fulfillment</i>	<i>Very little fulfillment</i>		
Question 29 Do you have access to image retrieval through an image workstation	yes	no		
Question 30 Based on what you know now, would you want access to an image workstation if you could have it?	<i>Definitely yes</i>	<i>Probably No</i>		

Question 31

How would you describe your amount of usage of image retrieval through an image workstation during the past three months?

Question 32

How satisfied are you with the following aspects of image retrieval through an image workstation?

	satisfied	dissatisfied	important	not important
How would you describe your amount of usage of image retrieval through an image workstation during the past three months?	63.00	37.00		
a. Accessibility of the image workstation equipment to your work area	88.00	12.00	99.00	1.00
b. Availability of image workstation equipment when you need to use it	89.00	10.00	99.00	1.00
c. Operability and maintenance of terminals and CRTs in the image workstation area	76.00	24.00	97.00	3.00
d. Log on/connect time required to initiate image retrieval through an image workstation	40.00	60.00	95.00	5.00
e. System response time required to go to first patent while doing image retrieval through an image workstation	40.00	60.00	96.00	4.00
f. System response time required to go screen-to-screen or patent-to-patent while doing image retrieval through an image workstation	49.00	51.00	96.00	4.00
g. Overall user-friendliness (ease of operation) involved in doing image retrieval through an image workstation	79.00	21.00	92.00	8.00
h. System recoverability (ability to save work following a system crash, lock-up or boot-off) while doing image retrieval through an image workstation	44.00	56.00	94.00	6.00
Question 33	Complete fulfillment	Very little fulfillment		
To what extent does image retrieval through an image workstation fulfill the information needs of your job?	78.00	23.00		

QUESTION 34a - 34ccc

34. What positive impact would the following features have on your ability to perform your job more effectively?	high impact	little impact
a. More access to APS and the walk-up printers on Saturdays and Sundays	25.00	75.00
b. More access to APS and the walk-up printers on weekday evenings	19.00	81.00
c. Access to patent material prior to 1971 (text)	59.00	41.00
d. Access to electronic image search and retrieval (on image workstation)	48.00	52.00
e. More machines available at peak usage periods in my work area (either shared, single screen text terminals or image workstations)	28.00	72.00
f. Connection of my PC to the PTO network by modem or PTO Net (text only)	35.00	65.00
g. Fewer system crashes and lock-ups, fewer times kicked off the network	47.00	53.00
h. Faster log-in on the image workstation	33.00	67.00
i. Faster response time at an image workstation (text and image)	44.00	56.00
j. Faster response time at the shared, single screen text terminals (text only)	34.00	66.00
k. Faster response time at my desktop PC (text only)	52.00	48.00
l. An APS search routine that will initiate my search inquiry within my "narrowed" specification (class and sub-class, rather than searching through all patents all over again.)	59.00	41.00
m. Ability to create and store a personal digest of relevant documents (e.g., journal articles, foreign patents, etc.)	57.00	43.00
n. A thesaurus/registry feature that would automatically pull up all similar terms and spellings within any art area	65.00	35.00
o. Ability to search a single European patent database electronically	58.00	42.00
p. Ability to search Canadian patents electronically	43.00	57.00
q. Ability to access foreign art on the image workstation	58.00	42.00

	<i>high impact</i>	<i>little impact</i>
r. An electronic lexicon, to cross-reference foreign terms and their English equivalents	55.00	45.00
s. Ability to cross-reference foreign and US classification systems	52.00	48.00
t. Ability to search abstracts of foreign patents (Europeans, Japanese, Canadian) on my desktop PC	63.00	37.00
u. Image and text on my desktop PC, with the ability to easily switch back and forth	78.00	22.00
v. Ability to access all commercial databases on my desktop PC	57.00	43.00
w. Automatic log-in, where I can access a variety of databases in one session without having to log on and off	59.00	41.00
x. More consistent commands across all databases used at PTO	63.00	37.00
y. Simpler, more user-friendly commands tailored to the way search is commonly conducted in my group	52.00	48.00
z. More mouse-driven convenience functions (as in WordPerfect)	37.00	63.00
aa. More functional integration between the text screen and the image screen (e.g., highlight on a portion of text and call up associated images, or mouse to a figure in image and call up associated text)	58.00	42.00
bb. Ability to scroll up and down on the image workstation, rather than just zoom in and out	40.00	60.00
cc. Ability to access inference prints on the image workstation	37.00	63.00
dd. Ability to have the search terms highlighted on the print-out copy of the patent	43.00	57.00
ee. A more convenient (or automatic) back-up-and-save feature	33.00	67.00
ff. Page buffering at the shared, single screen text terminals and image workstations, as well as on my PC	29.00	71.00
gg. Ability to search on the oldest effective priority date	35.00	65.00

	<i>high impact</i>	<i>little impact</i>
hh. Ability to search on a mathematical equation	16.00	84.00
ii. Ability to search on a chemical structure	26.00	74.00
jj. Ability to search on a sequence of layered materials	28.00	72.00
kk. Alternative to search modalities, such as target search (like Dialog); freestyle search (like Lexis); or fuzzy logic	36.00	64.00
ll. Ability to search two or more words in a sentence in any specified order	32.00	68.00
mm. Ability to conduct large scale searches without exceeding system capacity	43.00	57.00
nn. Indication of the number of pages that will be printed out before I hit "print" key	37.00	63.00
oo. A "break" key that promptly stops the processing when I hit it	55.00	45.00
pp. A "help" function key that suggests possible solutions to the problem, then returns me to the prompt	42.00	58.00
qq. A help line that delivers well-informed and timely help	48.00	52.00
rr. Better maintenance of hardware in the shared use/cluster workstations (CRTs, terminals, printers)	45.00	55.00
ss. Better maintenance at the walk-up printers (paper, toner, clearing of jams)	54.00	46.00
tt. Advanced/refresher training on new APS features, tailored to the way search is conducted in my area	65.00	35.00
uu. An on-line tutorial, to acquaint me with the latest feature	48.00	52.00
vv. More practice time to learn APS features	52.00	48.00
ww. More opportunity to swap ideas among examiners on how to conduct search	38.00	62.00
xx. A more clearly defined pipeline for communications--and getting feedback on-suggestions for improving APS	37.00	63.00

	<i>high impact</i>	<i>little impact</i>
yy. The ability to place notes on electronic files	32.00	68.00
zz. Capability to save the NDC anytime in the search session	29.00	71.00
aaa. An assignee search function that really works	28.00	72.00
bbb. Notation of where hits come from, in the case of merged sub-classes	36.00	64.00
ccc. E-mail to facilitate internal communication and transfer of documents	41.00	59.00
QUESTION 35		
Now that you've had a chance to work through the latter list of possible enhancements, please go back over that list one more time and indicate here which items in your opinion would have the most impact on your job performance (Write in the corresponding alphabetical symbol.)		
a. Most positive impact item:	Access to patent material prior to 1971 (text)	
b: Second most positive impact item:	Image and text on desktop PC, with ability to easily switch back and forth	
c. Third most positive impact item:	Ability to search abstracts of foreign patents on my desktop PC	
QUESTION 36	<i>yes</i>	<i>no</i>
Do you currently have access to one or more commercial databases?	46.00	54.00
QUESTION 37	<i>Definitely yes</i>	<i>Probably no</i>
Based on what you know now, would you want access to one or more commercial databases, if you could have it?	59.00	41.00
QUESTION 38	<i>heavy usage</i>	<i>light usage</i>
If you were given access to one or more commercial databases, what do you think would be your overall usage of those databases?	36.00	64.00

QUESTION 39

From where do you currently have access to the following commercial database(s)?

	<i>At a special center</i>	<i>At the Scientific and Technical Information Center</i>	<i>At my desktop PC</i>
CAS/STN	38.00	21.00	42.00
Derwent	31.00	43.00	26.00
Dialog	38.00	24.00	38.00
Lexis	19.00	69.00	12.00
Westlaw	11.00	82.00	6.00
Orbit	42.00	33.00	25.00
Other	30.00	45.00	24.00
QUESTION 40			
<i>heavy usage</i>			
What has been your level of usage of commercial database(s) during the past three months?			
CAS/STN	27.00	73.00	
Derwent	13.00	88.00	
Dialog	19.00	81.00	
Lexis	3.00	97.00	
Westlaw	2.00	98.00	
Orbit	8.00	92.00	
Other	9.00	91.00	

QUESTION 41	satisfied	dissatisfied
How satisfied are you with the availability of your commercial database(s) when you need to use it (them)?		
CAS/STN	82.00	18.00
Derwent	74.00	26.00
Dialog	76.00	24.00
Lexis	53.00	47.00
Westlaw	45.00	55.00
Orbit	69.00	31.00
Other	60.00	40.00
QUESTION 42	satisfied	dissatisfied
How satisfied are you with the log on/connect time required to initiate a search of the commercial database(s)?		
CAS/STN	81.00	19.00
Derwent	75.00	25.00
Dialog	75.00	25.00
Lexis	62.00	38.00
Westlaw	57.00	43.00
Orbit	68.00	32.00
Other	62.00	38.00

QUESTION 43		<i>satisfied</i>	<i>dissatisfied</i>
How satisfied are you with the system response time required to execute a search and go to the first screen while doing a search of your commercial data base(s)?			
CAS/STN	86.00	14.00	
Derwent	79.00	21.00	
Dialog	78.00	22.00	
Lexis	72.00	28.00	
Westlaw	67.00	33.00	
Orbit	74.00	26.00	
Other	64.00	36.00	
QUESTION 44		<i>satisfied</i>	<i>dissatisfied</i>
How satisfied are you with system response time required to go screen-to-screen while doing a search of your commercial database(s)?			
CAS/STN	86.00	14.00	
Derwent	76.00	24.00	
Dialog	79.00	21.00	
Lexis	65.00	35.00	
Westlaw	64.00	36.00	
Orbit	71.00	29.00	
Other	67.00	33.00	

QUESTION 45	satisfied	dissatisfied
How satisfied are you with the overall user-friendliness (ease of operation) involved in using your commercial database(s)?		
CAS/STN	75.00	25.00
Derwent	63.00	38.00
Dialog	60.00	40.00
Lexis	56.00	44.00
Westlaw	50.00	50.00
Orbit	49.00	51.00
Other	59.00	41.00
QUESTION 46		
How satisfied are you with the initial training you received on how to use your commercial database(s)?		
CAS/STN	77.00	23.00
Derwent	61.00	39.00
Dialog	69.00	31.00
Lexis	52.00	48.00
Westlaw	38.00	62.00
Orbit	63.00	37.00
Other	50.00	50.00

QUESTION 47	satisfied	dissatisfied
How satisfied are you with the amount and quality of documentation you have on how to use your commercial database(s)?		
CAS/STN	74.00	26.00
Derwent	64.00	36.00
Dialog	64.00	36.00
Lexis	43.00	57.00
Westlaw	35.00	65.00
Orbit	56.00	44.00
Other	44.00	56.00
QUESTION 48	complete fulfillment	little fulfillment
To what extent does your commercial database fulfill the information needs of your job?		
CAS/STN	41.00	59.00
Derwent	24.00	76.00
Dialog	31.00	69.00
Lexis	14.00	86.00
Westlaw	12.00	88.00
Orbit	15.00	85.00
Other	34.00	66.00

QUESTION 4.9

Which examining group are you currently assigned to?

	% Response distribution
1100	8.00
1200	4.00
1300	5.00
1500	6.00
1800	9.00
2100	6.00
2200	3.00
2300	7.00
2400	5.00
2500	11.00
2600	10.00
2900	2.00
3100	4.00
3200	5.00
3300	6.00
3400	5.00
3500	6.00

QUESTION 50

What is the four digit number of the art unit, i.e., the examining subgroup, you are currently assigned to?

(Individual cells too small for cross tabulation;
must be analyzed separately as illustrative cases.)

QUESTION 51		chemical	electrical	mechanical
Do you consider your art to be predominantly		32.00	35.00	33.00
QUESTION 52				
How would you describe your current computer expertise?	% Response distribution			
Complete beginner	3.00			
Novice - still much to learn	27.00			
Intermediate user - fairly knowledgeable	44.00			
Advancer user - very knowledgeable	21.00			
Computer pro - extremely knowledgeable	6.00			
QUESTION 53				
How long have you worked with the PTO as a patent examiner?	% Response distribution			
Under 1 year	10.00			
1-3 years	16.00			
3 to 5 years	25.00			
5 to 10 years	20.00			
Over 10 years	29.00			
QUESTION 54				
Are you a primary examiner?	yes	no		
	40.00	60.00		
QUESTION 55				
Are you a supervisory patent examiner?	yes	no		
	6.00	94.00		

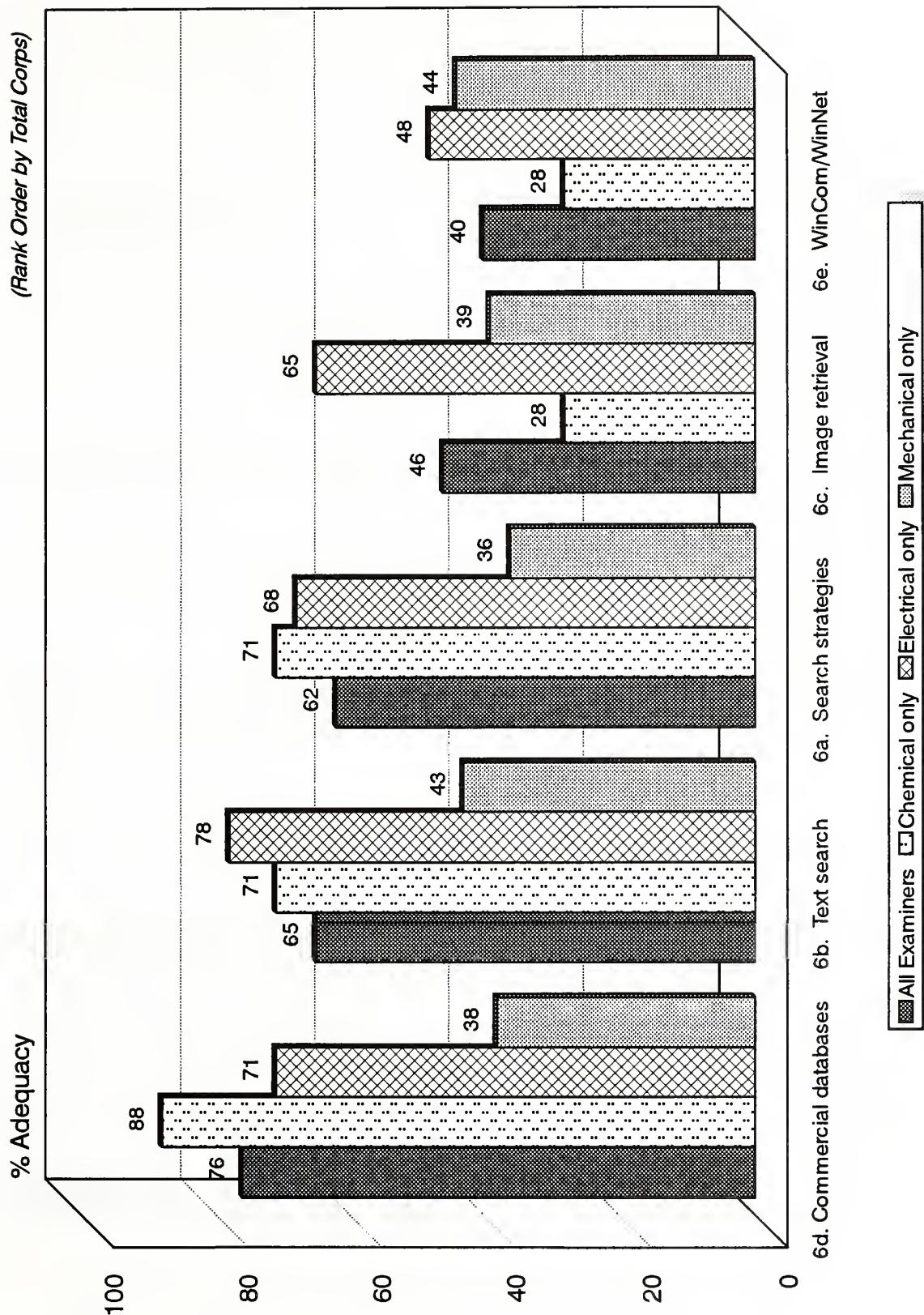
QUESTION 56	
How long have you been a federal employee?	% Response distribution
Under 1 year	7.00
1-3 years	15.00
3 to 5 years	24.00
5 to 10 years	22.00
Over 10 years	31.00
QUESTION 57	
What is your pay grade?	% Response distribution
Grades 5-8	7.00
Grades 9-12	25.00
Grades 13-15	62.00
Grade 15 and over (or SES)	7.00
Ungraded	0.00
Other	0.00
QUESTION 58	
Do you usually work?	% Response distribution
Regular business hours	92.00
Early weekday mornings	33.00
Weekday evenings	24.00
Saturdays	35.00
Sundays	30.00

Note: Due to the multiple response nature of Question 58, the frequency distribution is reported as individual values.

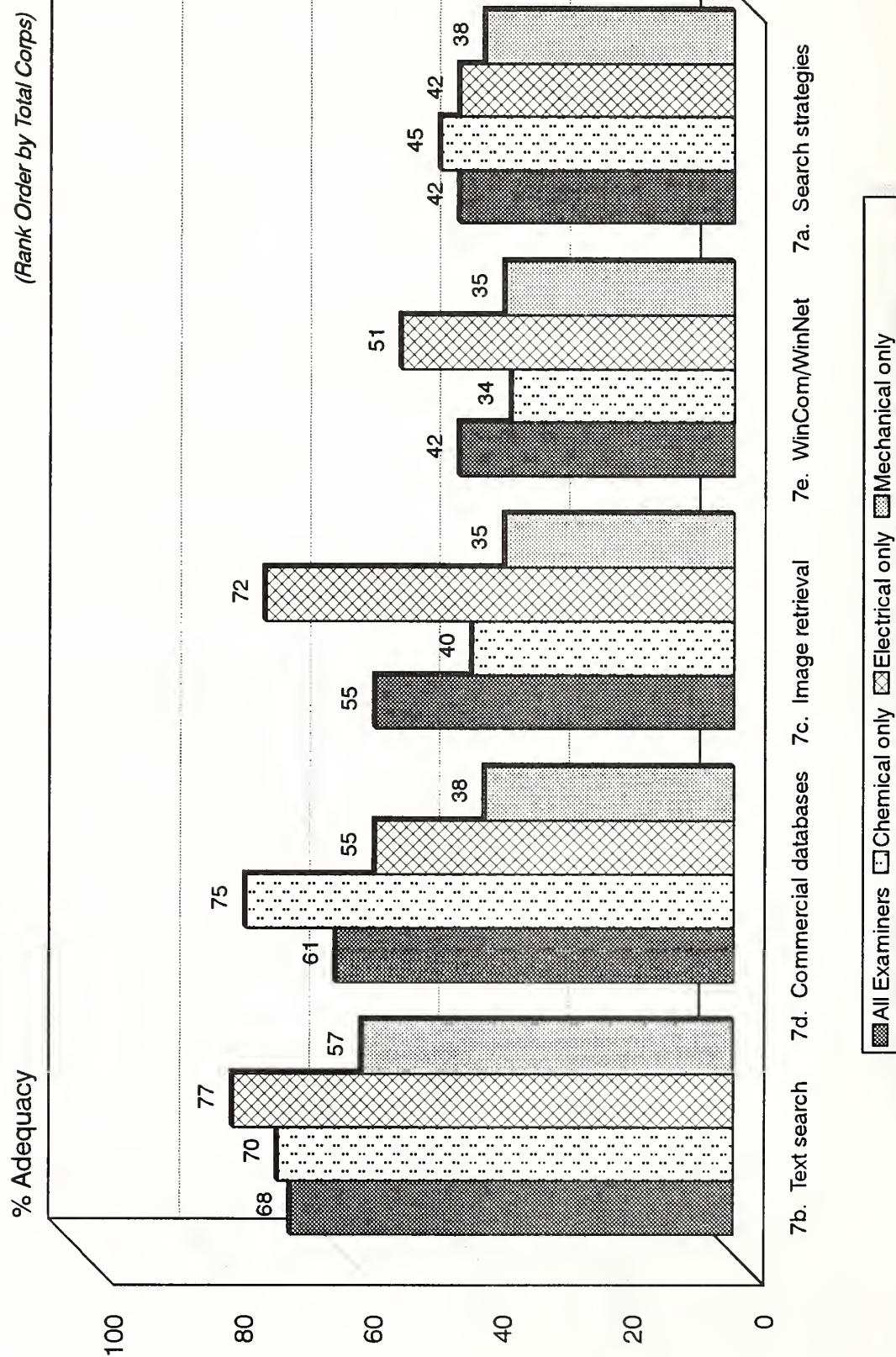
QUESTION 59		% Response distribution
What level of education have you completed?		
Graduated from college		100.00
Some graduate school		36.00
Law school graduate (LL.B)		16.00
Graduate or other professional degree (MA,MS,MBA,Ph.D, etc)		48.00
<i>Note: Due to the multiple response nature of Question 59, the frequency distribution is divided into two groups: a) Graduated from college; and b) Graduate school level.</i>		
QUESTION 60		% Response distribution
What is your age?		
20-29		31.00
30-39		39.00
40-49		20.00
50-59		9.00
60-64		2.00
65 or older		0.00

REFRESHER TRAINING ADEQUACY

(Rank Order by Total Corps)

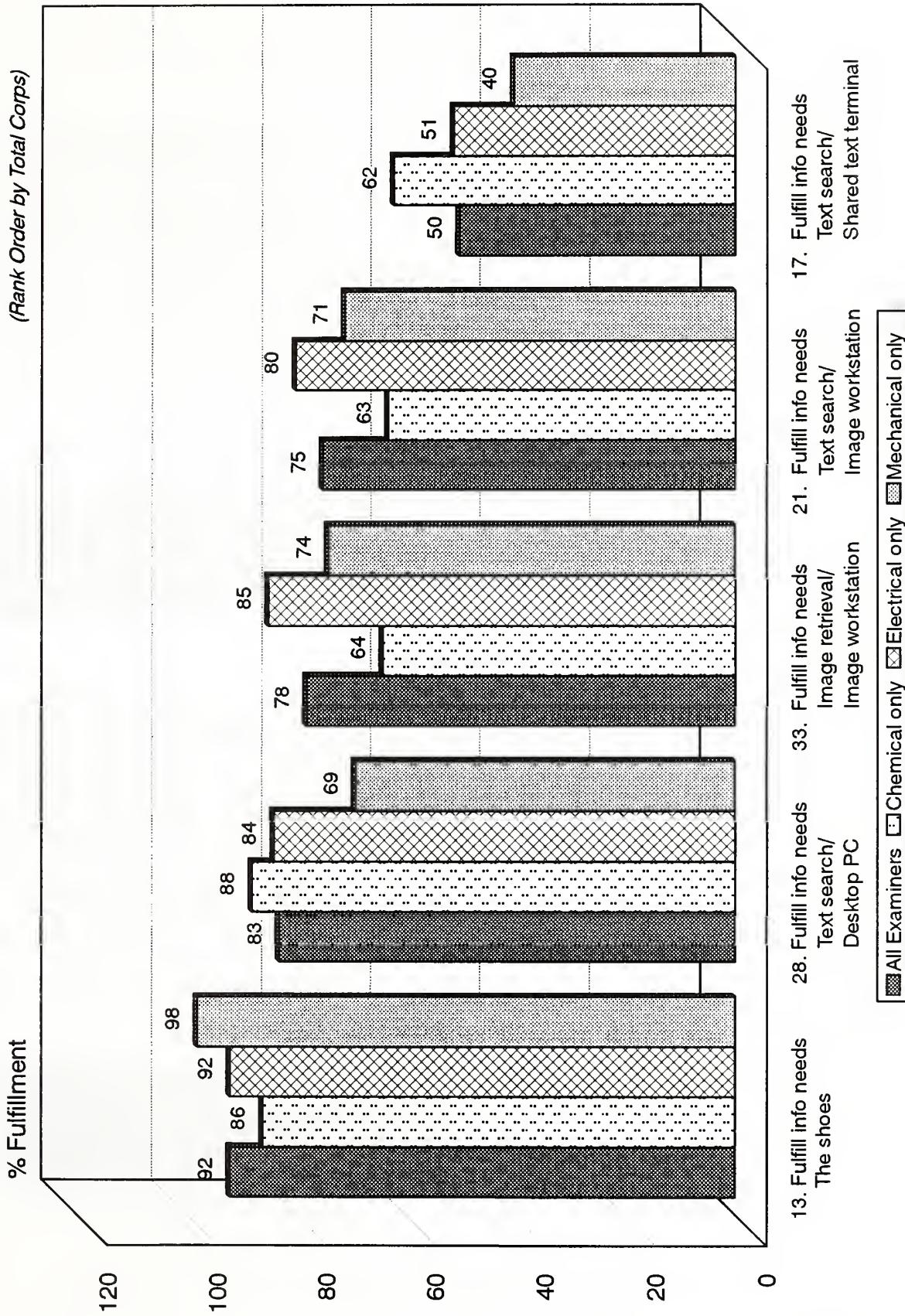


DOCUMENTATION & REFERENCE MATERIALS

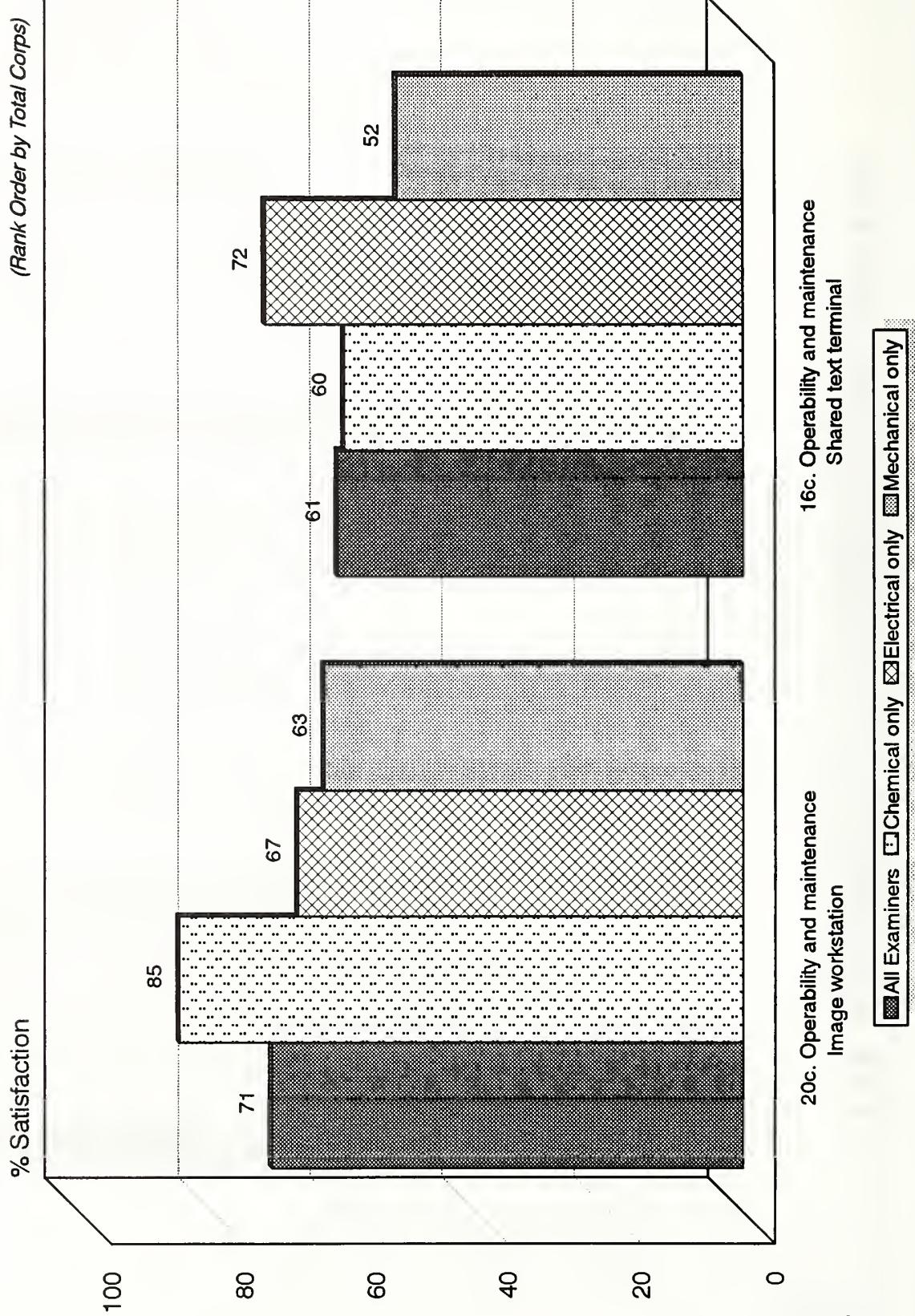


FULFILLMENT OF INFORMATION NEEDS

(Rank Order by Total Corps)

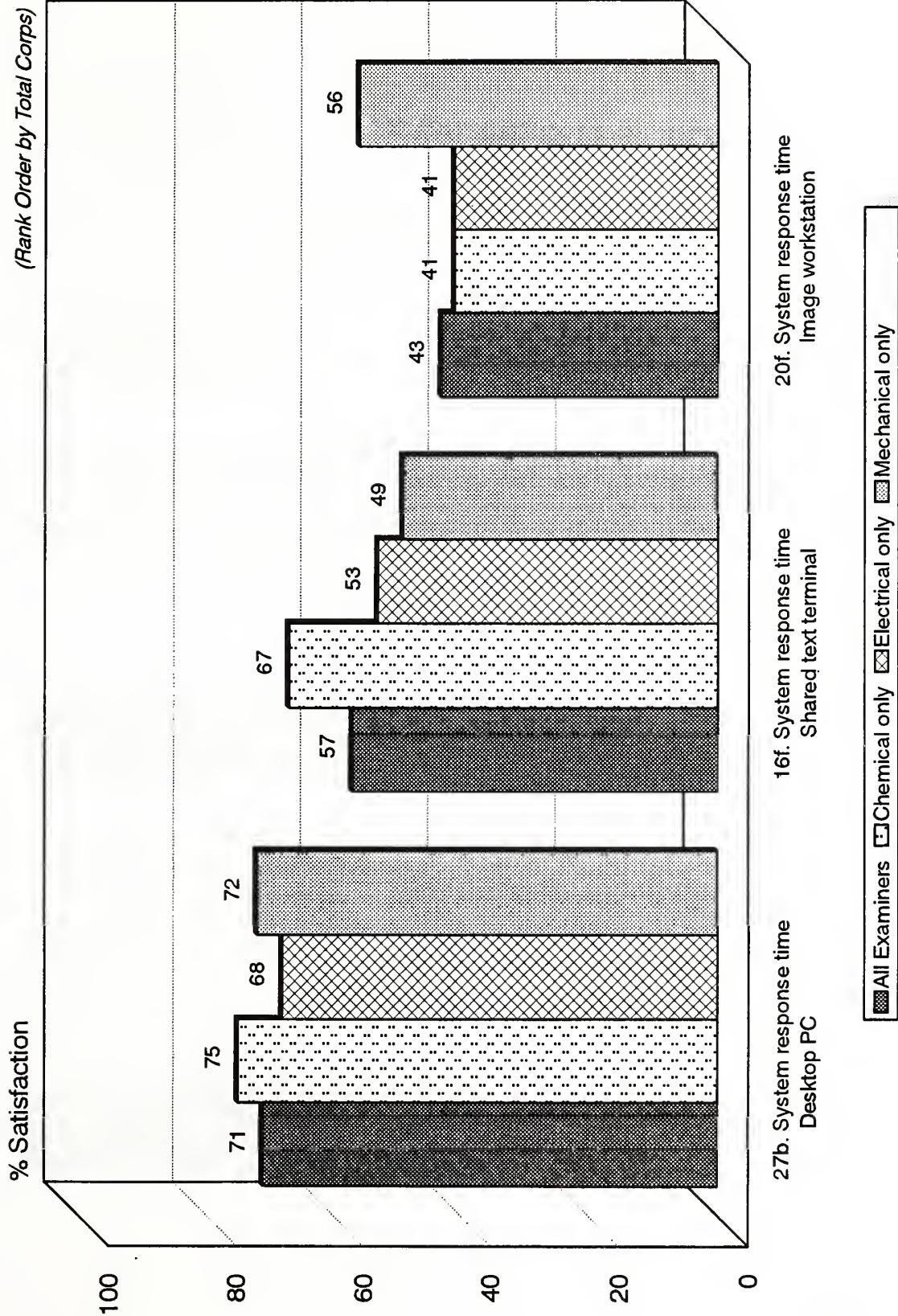


OPERABILITY & MAINTENANCE (Of Terminals & CRTs)

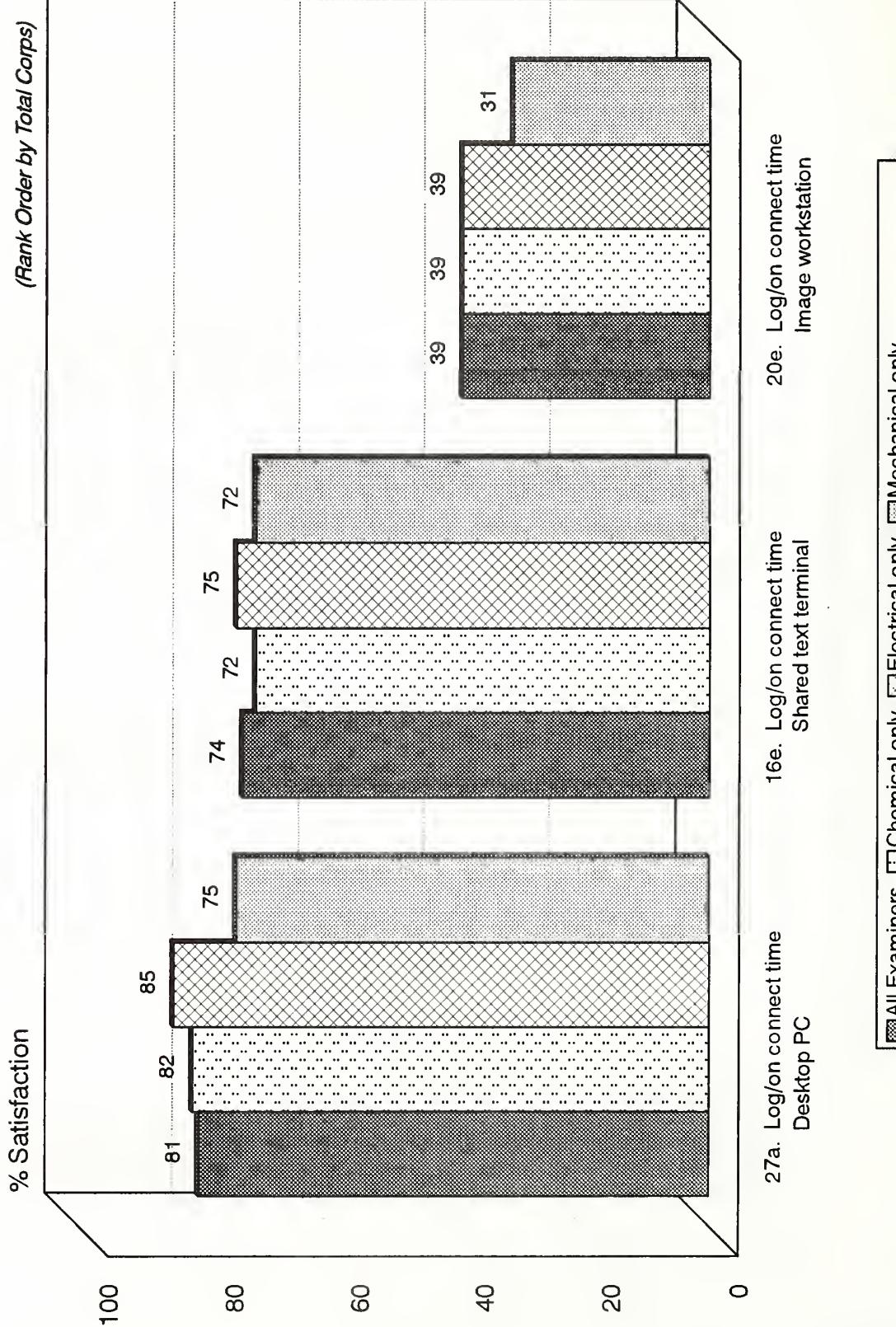


SYSTEM RESPONSE TIME

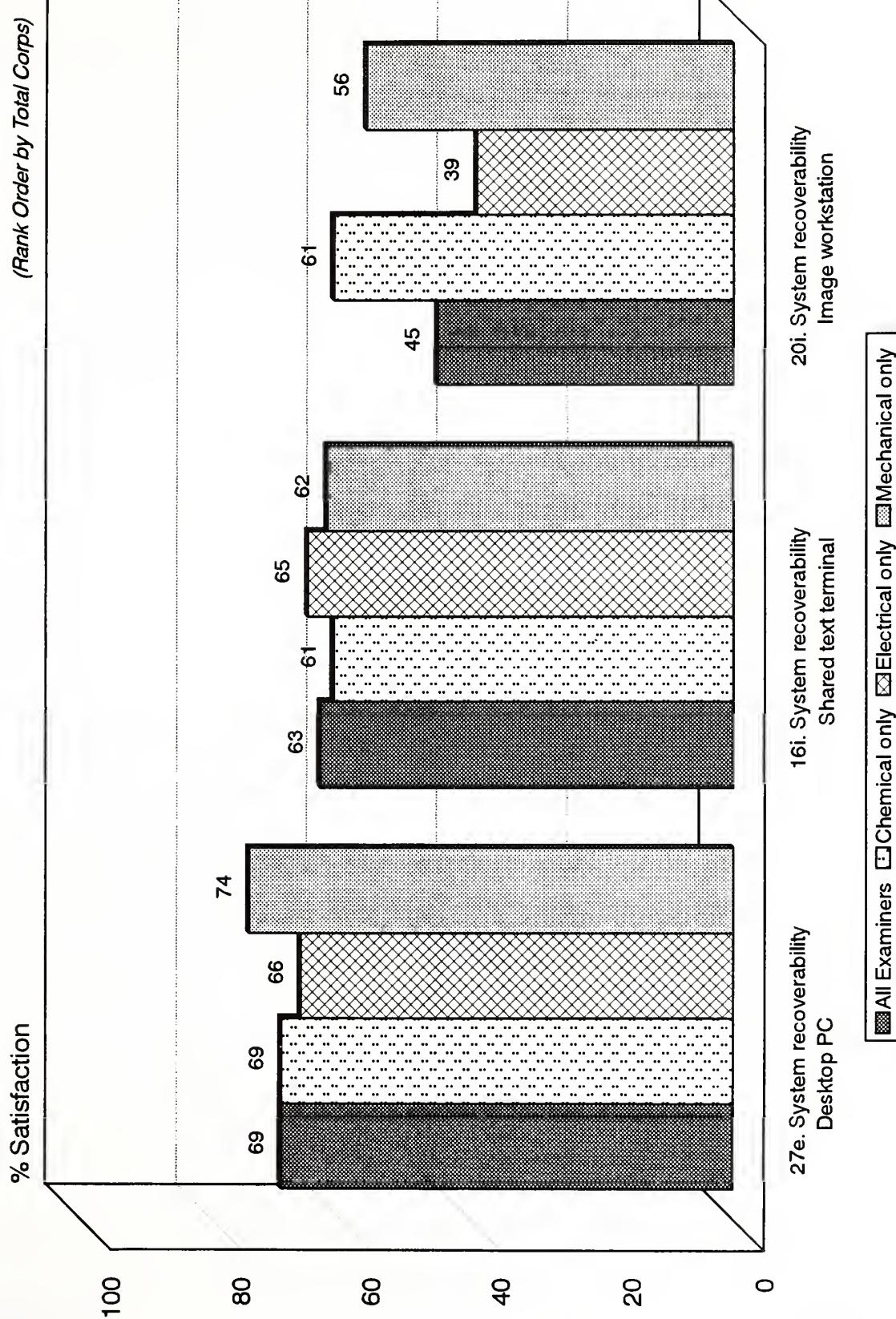
(To Execute a Search)



LOG ON/CONNECT TIME



SYSTEM RECOVERABILITY

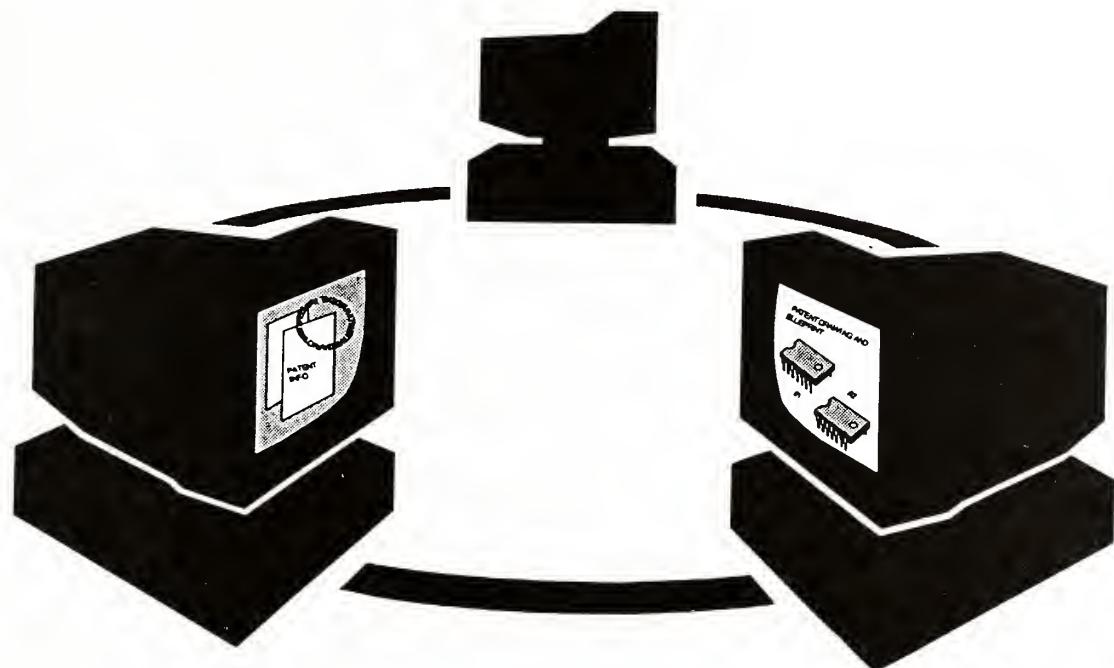


Appendix F

Survey Questionnaire and Cover Letters

APS USER CENSUS

OCTOBER 1994



MATI-IS
& ASSOCIATES



October, 1994

Dear Internal USPTO APS User:

We have been engaged for the purpose of evaluating how well the USPTO's APS is meeting the needs of the patent examining corps. This survey is one part of a multifaceted review of the USPTO's automated systems. You may also be invited to participate in other aspects of this review.

Today, we are inviting you now to give us feedback about your expectations and satisfaction with various aspects of the APS. Your feedback is very important and your responses will be treated confidentially. You need not sign your name or provide other identifying information. Please complete the questionnaire and return it promptly to us in the envelope provided.

Thank you for taking the time to complete this questionnaire.

Sincerely,

Mathis & Associates

OVERVIEW

This survey is intended to help the USPTO assess your satisfaction with the performance of the APS. As you consider your experience with the APS, we would like you to rate how well your expectations have been met in each of the specified areas and the relative importance of each element.

The survey is divided into five parts:

- Overall Information Resource Assessment
- Research Tools Assessment
- Future Needs Assessment
- Demographics
- Comments

Your open and honest evaluation is important and we will safeguard the confidentiality of your responses. Keep in mind that the objective of this study is to gather first-hand impressions from the internal USPTO APS users so that your constructive feedback can be integrated into the USPTO's comprehensive review of its automated systems.

INSTRUCTIONS

Under the **Satisfaction** heading, please place an "X" in the appropriate circle. Please use the following scale:

- 1 = Very satisfied
- 2 = Generally satisfied
- 3 = Neutral
- 4 = Generally dissatisfied
- 5 = Very dissatisfied
- N/A = No answer

Under the **Relative Importance** heading, please indicate how important you feel each area is to your ability to perform your job by placing an "X" in the appropriate circle. Please use the following scale:

- 1 = Critically important
- 2 = Very important
- 3 = Somewhat important
- 4 = Not too important
- 5 = Not at all important

(As you apply the importance scale, keep in mind the adage that if everything is of equal importance, no element is more important than any other. Try to establish some priorities about your needs and reflect those priorities in your scoring.)

A few questions ask you to indicate frequency of use, estimated impact, or require a "yes" or "no" response.

If you would like to comment further on a question, you may use the last page.

OVERALL INFORMATION RESOURCE ASSESSMENT

In this section, you are asked to indicate your satisfaction with various aspects of the information resources available to you at PTO. In addition, please indicate how important each element is to the performance of your job. If you do not have enough experience to make an informed evaluation, select N/A for "no answer." (Note that many of these issues will be examined in a more detailed way further along in this questionnaire.)

	Satisfaction	Relative Importance									
		1 = Very satisfied	2 = Generally satisfied	3 = Neutral	4 = Generally dissatisfied	5 = Very dissatisfied	1 = Critically important	2 = Very important	3 = Somewhat important	4 = Not too important	5 = Not at all important
	N/A	1	2	3	4	5	1	2	3	4	5
1. How satisfied are you with the following aspects of PTO's information resources?											
a. The initial training you received on how to use the computer resources (then) available to you		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The refresher/update training you have received on how to use the computer resources currently available to you		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. The documentation and reference materials needed to use the equipment, systems, and databases currently available to you		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Your access (hook-up) to APS and other databases needed to do your job		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Availability and maintenance of terminals, PCs, and CRTs needed to do your job		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Availability of printers needed to do your job		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Overall cleanliness in the shared facility workspace		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Overall lighting in the shared facility workspace		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Overall climate control in the shared facility workspace		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Effectiveness of the Help Desk (305-9000) in resolving equipment problems or systems problems you encounter in the course of doing your job		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Availability of someone who can help get you through some of the more difficult or obscure situations that sometimes arise with APS		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Effectiveness of the PTO Newsletter in keeping you informed about system changes, new features, and how to use them		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Opportunities for swapping information among colleagues about search methods and techniques		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OVERALL INFORMATION RESOURCE ASSESSMENT

CONTINUED

Satisfaction	Relative importance
1 = Very satisfied	1 = Critically important
2 = Generally satisfied	2 = Very Important
3 = Neutral	3 = Somewhat important
4 = Generally dissatisfied	4 = Not too important
5 = Very dissatisfied	5 = Not at all important

- n. Accuracy and reliability of the classification system within your art area, in order to get the proper "hits"
 - o. Hours of operation of APS and the walk-up printers
 - p. Overall reliability of APS and its supporting networks
 - q. Overall user-friendliness (ease of operation) of APS
 - r. Customization of APS to the needs of your examining group
 - s. Availability of a channel for submitting systems-related suggestions for improvement
 - t. Feedback on suggestions submitted
 - u. Reliable information about system changes and enhancements scheduled for implementation

2. Have you received initial training in any of the following areas – and if so, what year?

Yes

No

Search strategies and methods for your art area in 19

Text search on APS in 19

Image retrieval on an image workstation in 19

Use of one or more commercial databases
(Consider the one most important to you.) in 19

WinCom/WinNet in 19

Other (please specify) _____ in 19

OVERALL INFORMATION RESOURCE ASSESSMENT
CONTINUED

3. How would you rate the adequacy of your initial training, in each of the following areas?

	N/A	Never received initial training on this	Very adequate	Generally adequate	Generally inadequate	Very inadequate
a. Search strategies and methods for your art area						
b. Text search on APS						
c. Image retrieval on an image workstation						
d. Use of one or more commercial databases (Rate the one most important to you.)						
e. WinCom/WinNet						
f. Other (please specify) _____						

4. How much of your initial training do you still remember?

	N/A	Never received initial training on this	Most of it	Some	Very little	Almost nothing
a. Search strategies and methods for your art area						
b. Text search on APS						
c. Image retrieval on an image workstation						
d. Use of one or more commercial databases (Rate the one most important to you.)						
e. WinCom/WinNet						
f. Other (please specify) _____						

OVERALL INFORMATION RESOURCE ASSESSMENT

CONTINUED

5. Have you received refresher/update training in any of the following areas?

	Yes	No
Search strategies and methods for your art area	<input type="radio"/>	<input type="radio"/>
Text search on APS	<input type="radio"/>	<input type="radio"/>
Image retrieval on an image workstation	<input type="radio"/>	<input type="radio"/>
Use of one or more commercial databases (Consider the one most important to you.)	<input type="radio"/>	<input type="radio"/>
WinCom/WinNet	<input type="radio"/>	<input type="radio"/>
Other (please specify) _____	<input type="radio"/>	<input type="radio"/>

6. How would you rate the adequacy of your refresher/update training, in each of the following areas?

N/A	Never received initial training on this	Very adequate	Generally adequate	Generally inadequate	Very inadequate
-----	---	---------------	--------------------	----------------------	-----------------

a. Search strategies and methods for your art area _____	<input type="radio"/>				
b. Text search on APS _____	<input type="radio"/>				
c. Image retrieval on an image workstation _____	<input type="radio"/>				
d. Use of one or more commercial databases (Rate the one most important to you.) _____	<input type="radio"/>				
e. WinCom/WinNet _____	<input type="radio"/>				
f. Other (please specify) _____	<input type="radio"/>				

OVERALL INFORMATION RESOURCE ASSESSMENT
CONTINUED

7. How would you rate the adequacy of documentation and reference materials in each of the following areas?

	N/A	Very adequate	Generally adequate	Generally inadequate	Very inadequate
a. Search strategies and methods for your art area	<input type="radio"/>				
b. Text search on APS	<input type="radio"/>				
c. Image retrieval on an image workstation	<input type="radio"/>				
d. Use of one or more commercial databases (Rate the one most important to you.)	<input type="radio"/>				
e. WinCom/WinNet	<input type="radio"/>				
f. Other (please specify) _____	<input type="radio"/>				

8. How satisfied are you that you have the training and skills needed to fully utilize the information resources available to you at PTO?

Very satisfied	Generally satisfied	Neutral	Generally dissatisfied	Very dissatisfied
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

RESEARCH TOOLS ASSESSMENT

In this section, you are asked to describe your level of usage of the various channels used to access APS and how well each of those channels is performing. If you do not have access to a particular channel, select N/A for "no access."

- 1=I use it for nearly every application
- 2=I use it for most applications
- 3=I use it for some applications
- 4=I use it very infrequently
- 5=I do not use it

9. How would you describe your level of usage of the following PTO research channels?

	Nearly every application	Most applications	Some applications	Very infrequently	Do not use
N/A	1	2	3	4	5

a. The shoes	<input type="radio"/>					
b. Text search through a shared, single screen text terminal	<input type="radio"/>					
c. Text search through an image workstation	<input type="radio"/>					
d. Text search through my desktop PC	<input type="radio"/>					
e. Image search at an image workstation	<input type="radio"/>					
f. Commercial databases at a special center (or a shared facility workspace)	<input type="radio"/>					
g. Commercial databases through my desktop PC	<input type="radio"/>					
h. Library reference volumes (journal articles, foreign patents, etc.)	<input type="radio"/>					
i. Walk-up printers	<input type="radio"/>					
j. Printers in the shared facility workspace	<input type="radio"/>					
k. Printer at or near my desktop	<input type="radio"/>					

RESEARCH TOOLS ASSESSMENT CONTINUED

Shoe Search

10. Do you have access to the shoes in the course of performing your job?

Yes No (skip to question 14)

11. How would you describe your amount of usage of the shoes during the past three months?

Very heavy (nearly every day)	Heavy (one or more times per week)	Medium (1-3 times per month)	Light (less than once per month)	None (skip to question 13)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

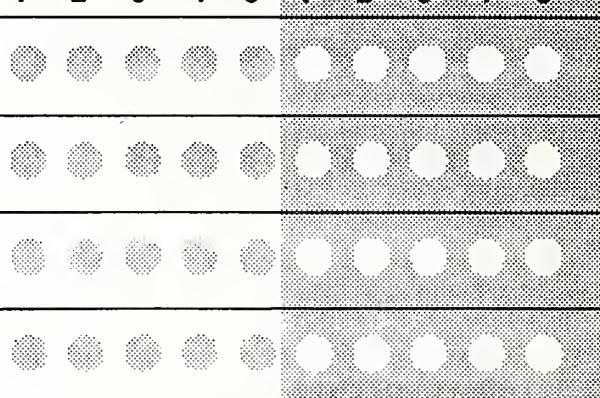
Satisfaction
1 = Very satisfied
2 = Generally satisfied
3 = Neutral
4 = Generally dissatisfied
5 = Very dissatisfied

1 2 3 4 5 1 2 3 4 5

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

12. How satisfied are you with the following aspects of the shoes?

- a. Need to travel or move around to get the material you need
- b. Overall cleanliness and ease of working in the shoe area
- c. File integrity (completeness of expected items)
- d. Speed with which you can search the shoes and locate needed material



13. To what extent do the shoes fulfill the information needs of your job?

Completely To a large extent To some extent Very little Not at all

Text search through a shared, single-screen text terminal

14. Do you have access to text search through a shared, single-screen text terminal?

Yes

No (skip to question 18)

15. How would you describe your amount of usage of text search through a text terminal during the past three months?

Very heavy (nearly
every day)

Heavy (one or more
times per week)

Medium (1-3 times
per month)

Light (less than
once per month)

None
(skip to question 17)



Satisfaction

1 = Very satisfied

2 = Generally satisfied

3 = Neutral

4 = Generally dissatisfied

5 = Very dissatisfied

Relative Importance

1 = Critically important

2 = Very important

3 = Somewhat important

4 = Not too important

5 = Not at all important

16. How satisfied are you with the following aspects of
text search through a shared text terminal?

1 2 3 4 5 1 2 3 4 5

- a. Accessibility of the shared text terminal equipment to your work area
- b. Availability of shared text terminal equipment when you need to use it
- c. Operability and maintenance of terminals and CRTs in the shared text terminal area
- d. Operability and maintenance of printers in the shared text terminal area
- e. Log on/connect time required to initiate text search through a shared text terminal
- f. System response time required to execute a search while doing text search through a shared text terminal
- g. System response time required to go screen-to-screen or patent-to-patent while using a shared text terminal
- h. Overall user-friendliness (ease of operation) involved in using a shared text terminal
- i. System recoverability (ability to save work following a system crash, lock-up or boot-off) while using a shared text terminal

17. To what extent does text search through a shared text terminal fulfill the information needs of your job?

A-95

Completely

To a large extent

To some extent

Very little

Not at all

Text search through an image workstation

18. Do you have access to text search through an image workstation?

Yes

No (skip to question 22)

19. How would you describe your amount of usage of text search through an image workstation during the past three months?

Very heavy (nearly every day)



Heavy (one or more times per week)



Medium (1-3 times per month)



Light (less than once per month)



None
(skip to question 21)



20. How satisfied are you with the following aspects of text search through an image workstation?

a. Accessibility of the image workstation to your work area

Satisfaction
1 = Very satisfied
2 = Generally satisfied
3 = Neutral
4 = Generally dissatisfied
5 = Very dissatisfied

1

2

3

4

5

1

2

3

4

5

b. Availability of image workstation equipment when you need to use it

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

c. Operability and maintenance of terminals and CRTs in the image workstation area

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

d. Operability and maintenance of printers in the image workstation area

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

e. Log on/connect time required to initiate text search through an image workstation

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

f. System response time required to execute a search while doing text search through an image workstation

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

g. System response time required to go screen-to-screen or patent-to-patent while doing text search through an image workstation

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

h. Overall user-friendliness (ease of operation) involved in doing text search through an image workstation

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

i. System recoverability (ability to save work following a system crash, lock-up or boot-off) while doing text search through an image workstation

Relative Importance
1 = Critically important
2 = Very important
3 = Somewhat important
4 = Not too important
5 = Not at all important

1

2

3

4

5

1

2

3

4

5

21. To what extent does text search through an image workstation fulfill the information needs of your job?

Completely To a large extent To some extent Very little Not at all

Text search at a PC on or near your desktop

22. Do you have a PC on or near your desktop?

Yes, one PC Yes, more than one PC No (skip to question 29)

23. What kind of PC is it? (Check as many as apply.)

286 386 486 Mac

24. Is your PC currently hooked up to APS text? (Check as many as apply.)

Yes, via PTO Net

Yes, via modem

No, the PC has no hookup to APS text (Please state here the reason why, if you know, then skip to question 29): _____

25. Is your PC currently using WinCom or WinNet?

Yes, WinCom

Yes, WinNet

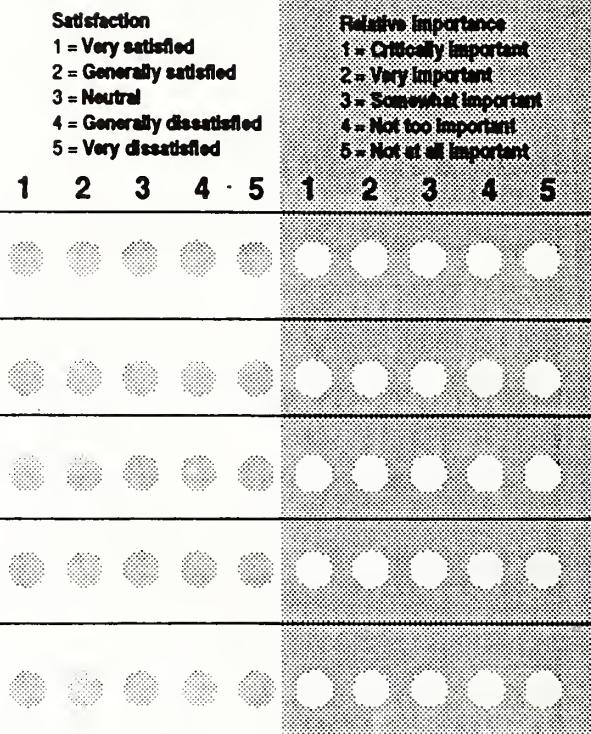
No, none of the above

Not sure

26. Is your PC hooked up to a working printer somewhere in your local work area?

Yes No (skip to question 29)

27. How satisfied are you with the following aspects of text search through your desktop PC?



28. To what extent does text search through your desktop PC fulfill the information requirements of your job?

Completely To a large extent To some extent Very little Not at all

Image Retrieval through an Image Workstation

29. Do you have access to image retrieval through an image workstation?

Yes (skip to question 31) No (answer question 30, then skip to question 34)

30. Based on what you know now, would you want access to an image workstation if you could have it?

Definitely yes Probably yes Not sure Probably no Definitely no

(Now skip to question 34)

31. How would you describe your amount of usage of image retrieval through an image workstation during the past three months?

Very heavy (nearly every day) Heavy (one or more times per week) Medium (1-3 times per month) Light (less than once per month) None
(Skip to question 33)



32. How satisfied are you with the following aspects of image retrieval through an image workstation?

Satisfaction					Relative Importance				
1	2	3	4	5	1	2	3	4	5
Very satisfied					Critically important				
Generally satisfied					Very important				
Neutral					Somewhat important				
Generally dissatisfied					Not too important				
Very dissatisfied					Not at all important				

- a. Accessibility of the image workstation to your work area
- b. Availability of image workstation equipment when you need to use it
- c. Operability and maintenance of terminals and CRTs in the image workstation area
- d. Log on/connect time required to initiate image retrieval through an image workstation
- e. System response time required to go to first patent while doing image retrieval through an image workstation
- f. System response time required to go screen-to-screen or patent-to-patent while doing image retrieval through an image workstation
- g. Overall user-friendliness (ease of operation) involved in doing image retrieval through an image workstation
- h. System recoverability (ability to save work following a system crash, lock-up or boot-off) while doing image retrieval through an image workstation

33. To what extent does image retrieval through an image workstation fulfill the information needs of your job?

Completely To a large extent To some extent Very little Not at all

FUTURE NEEDS ASSESSMENT

In this section, we are asking you to predict the likely positive impact on your job performance if certain features or enhancements were introduced in the future. Specifically, you are asked to indicate what positive impact, if any, a given item will have on your ability to carry out your job more effectively. Please use the scale indicated here:

34. What positive impact would the following features have on your ability to perform your job more effectively?

FUTURE NEEDS ASSESSMENT CONTINUED

	Major Impact	High Impact	Some Impact	Little Impact	Features already available to me	Not relevant to my area	Not sure
n. A thesaurus/registry feature that would automatically pull up all similar terms and spellings within any art area							
o. Ability to search a single European patent database electronically							
p. Ability to search Canadian patents electronically							
q. Ability to access foreign art on the image workstation							
r. An electronic lexicon, to cross-reference foreign terms and their English equivalents							
s. Ability to cross-reference foreign and U.S. classification systems							
t. Ability to search abstracts of foreign patents (European, Japanese, Canadian) on my desktop PC							
u. Image and text on my desktop PC, with the ability to easily switch back and forth							
v. Ability to access all commercial databases on my desktop PC							
w. Automatic log-in, where I can access a variety of databases in one session without having to log on and off							
x. More consistent commands across all databases used at PTO							
y. Simpler, more user-friendly commands tailored to the way search is commonly conducted in my group							
z. More mouse-driven convenience functions (as in WordPerfect)							
aa. More functional integration between the text screen and the image screen (e.g., highlight on a portion of text and call up associated images, or mouse to a figure in image and call up associated text)							
bb. Ability to scroll up and down on the image workstation, rather than just zoom in and out							

FUTURE NEEDS ASSESSMENT CONTINUED

	Major Impact	High Impact	Some Impact	Little Impact	Features already available to me	Not relevant to my area	Not sure
cc. Ability to access interference prints on the image workstation	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
dd. Ability to have the search terms highlighted on the print-out copy of the patent	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ee. A more convenient (or automatic) back-up-and-save feature	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ff. Page buffering at the shared, single screen text terminals and image workstations, as well as on my PC	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
gg. Ability to search on the oldest effective priority date	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hh. Ability to search on a mathematical equation	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ii. Ability to search on a chemical structure	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
jj. Ability to search on a sequence of layered materials	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
kk. Alternative search modalities, such as target search (like Dialog); freestyle search (like Lexis); or fuzzy logic	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ll. Ability to search two or more words in a sentence, in any specified order	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
mm. Ability to conduct large-scale searches without exceeding system capacity	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nn. Indication of the number of pages that will be printed out before I hit "print" key	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
oo. A "break" key that promptly stops the processing when I hit it	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
pp. A "help" function key that suggests possible solutions to the problem, then returns me to the prompt	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
qq. A help line that delivers well-informed and timely help	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

FUTURE NEEDS ASSESSMENT CONTINUED

	Major Impact	High Impact	Some Impact	Little Impact	Features already available to me	Not relevant to my area	Not sure
rr. Better maintenance of hardware in the shared use/cluster workstations (CRTs, terminals, printers)							
ss. Better maintenance at the walk-up printers (paper, toner, clearing of jams)							
tt. Advanced/refresher training on new APS features, tailored to the way search is conducted in my area							
uu. An on-line tutorial, to acquaint me with the latest features							
vv. More practice time to learn APS features							
ww. More opportunity to swap ideas among examiners on how to conduct search							
xx. A more clearly-defined "pipeline" for communicating – and getting feedback on – suggestions for improving APS							
yy. The ability to place notes on electronic files							
zz. Capability to save the NDC anytime in the search session							
aaa. An assignee search function that really works							
bbb. Notation of where hits come from, in the case of merged sub-classes							
ccc. E-mail, to facilitate internal communication and transfer of documents							

35. Now that you've had a chance to work through the latter list of possible enhancements, please go back over that list one more time and indicate here which items in your opinion would have the most impact on your job performance. (Write in the corresponding alphabetical symbol.)

- a. Most positive impact item: _____
- b. Second most positive impact item: _____
- c. Third most positive impact item: _____

Commercial Databases

36. Do you currently have access to one or more commercial databases?

Yes (skip to question 39) No (answer questions 37 and 38, then skip to question 49)

37. Based on what you know now, would you want access to one or more commercial databases, if you could have it?

Definitely yes Probably yes Not sure Probably no Definitely no

38. If you were given access to one or more commercial databases, what do you think would be your overall usage of those databases?

Very heavy (nearly every day) Heavy (one or more times per week) Medium (1-3 times per month) Light (less than once per month) None

(Now skip to question 49)

39. From where do you currently have access to the following commercial database(s)?

	At a special center near my work area	At the Scientific and Technical Information Center	At my desktop PC
CAS/STN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derwent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dialog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lexis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Westlaw	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orbit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. What has been your level of usage of commercial database(s) during the past three months?

	Very heavy (nearly every day)	Heavy (one or more times per week)	Medium (1-3 times per month)	Light (less than once per month)	None
CAS/STN					
Derwent					
Dialog					
Lexis					
Westlaw					
Orbit					
Other _____					

41. How satisfied are you with the availability of your commercial database(s) when you need to use it (them)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN				
Derwent				
Dialog				
Lexis				
Westlaw				
Orbit				
Other _____				

42. How satisfied are you with the log on /connect time required to initiate a search of the commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN				
Derwent				
Dialog				
Lexis				
Westlaw				
Orbit				
Other _____				

43. How satisfied are you with the system response time required to execute a search and go to the first screen while doing a search of your commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derwent	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dialog	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lexis	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Westlaw	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orbit	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. How satisfied are you with system response time required to go screen-to-screen while doing a search of your commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derwent	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dialog	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lexis	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Westlaw	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orbit	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

45. How satisfied are you with the overall user-friendliness (ease of operation) involved in using your commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Derwent	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dialog	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lexis	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Westlaw	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Orbit	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46. How satisfied are you with the initial training you received on how to use your commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN	●	●	●	●
Derwent	●	●	●	●
Dialog	●	●	●	●
Lexis	●	●	●	●
Westlaw	●	●	●	●
Orbit	●	●	●	●
Other _____	●	●	●	●

47. How satisfied are you with the amount and quality of documentation you have on how to use your commercial database(s)?

	Very satisfied	Generally satisfied	Generally dissatisfied	Very dissatisfied
CAS/STN	●	●	●	●
Derwent	●	●	●	●
Dialog	●	●	●	●
Lexis	●	●	●	●
Westlaw	●	●	●	●
Orbit	●	●	●	●
Other _____	●	●	●	●

48. To what extent does your commercial database fulfil the information needs of your job?

	Completely	To a large extent	To some extent	Very little	Not at all
CAS/STN	●	●	●	●	●
Derwent	●	●	●	●	●
Dialog	●	●	●	●	●
Lexis	●	●	●	●	●
Westlaw	●	●	●	●	●
Orbit	●	●	●	●	●
Other _____	●	●	●	●	●

DEMOGRAPHICS

The following information is needed to help us with the statistical analyses of all questionnaires. All of your responses are confidential and cannot be associated with you individually. Your responses will not be seen by anyone within PTO.

49. Which examining group are you currently assigned to?

- | | |
|----------------------------|----------------------------|
| <input type="radio"/> 1100 | <input type="radio"/> 2500 |
| <input type="radio"/> 1200 | <input type="radio"/> 2600 |
| <input type="radio"/> 1300 | <input type="radio"/> 2900 |
| <input type="radio"/> 1500 | <input type="radio"/> 3100 |
| <input type="radio"/> 1800 | <input type="radio"/> 3200 |
| <input type="radio"/> 2100 | <input type="radio"/> 3300 |
| <input type="radio"/> 2200 | <input type="radio"/> 3400 |
| <input type="radio"/> 2300 | <input type="radio"/> 3500 |
| <input type="radio"/> 2400 | |

50. What is the four digit number of the art unit, i.e., the examining subgroup, you are currently assigned to?

51. Do you consider your art to be predominantly . . .

Chemical

Electrical

Mechanical

52. How would you describe your current computer expertise?

- Complete beginner
- Novice - still much to learn
- Intermediate user - fairly knowledgeable
- Advanced user - very knowledgeable
- Computer pro - extremely knowledgeable

53. How long have you worked with the PTO as a patent examiner?

Under 1 year

1 to 3 years

3 to 5 years

5 to 10 years

Over 10 years

54. Are you a primary examiner?

Yes

No

55. Are you a supervisory patent examiner?

Yes

No

DEMOGRAPHICS CONTINUED

56. How long have you been a federal employee?

- Under 1 year 1 to 3 years 3 to 5 years 5 to 10 years Over 10 years

57. What is your pay grade?

- | | | | | | |
|-----------------------|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Grades 5-8 | Grades 9-12 | Grades 13-15 | Grade 15 and over (or SES) | Ungraded | Other |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

58. Do you usually work? (Check all that apply.)

- | | | | | |
|------------------------|------------------------|-----------------------|-----------------------|-----------------------|
| Regular business hours | Early weekday mornings | Weekday evenings | Saturdays | Sundays |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

59. What level of education have you completed? (Check all that apply.)

- Graduated from college (B.A., B.S., or other Bachelor's degree)
- Some graduate school
- Law school graduate (LL.B)
- Graduate or other professional degree (MA, MS, MBA, Ph.D, etc.)

60. What is your age?

- | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 20-29 | 30-39 | 40-49 | 50-59 | 60-64 | 65 or older |
| <input type="radio"/> |

COMMENTS

Please do not hesitate to elaborate on your responses to any of the questions in this census.

THANK YOU

We appreciate you taking the time to share your observations and opinions with us. When you are finished, please place the questionnaire in the enclosed envelope, seal it and mail it to us promptly at the pre-addressed location. No postage is required.

A-110



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

MEMORANDUM

TO: Patent Examiners

**FROM: Assistant Secretary of Commerce and
Commissioner of Patents and Trademarks**

The enclosed questionnaire is part of our commitment to solicit your feedback on determining the best tools and support for you to do your job.

I am asking you to spend a few minutes of your time to share your candid observations about the Automated Patent System (APS). Results from this study will provide essential information on the impact of APS on your work on a day-to-day basis and will provide guidance on any changes we need to make to better meet your needs. I strongly encourage you to express your ideas and report your first-hand experiences through this process. Additionally, information generated from this study will contribute to the dialogue on how future automation technology should be developed for your use. The results of this study will be tabulated by the end of the year and will be available to all of you.

All responses to the questionnaire are confidential. There are no coding or tracking systems that would allow the identification of individual employees.

Thank you for your contribution to this effort.

A handwritten signature in black ink that reads "Bruce Lehman".

Bruce A. Lehman

Enclosure



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

October 13, 1994

Dear PATENT EXAMINER:

In late October you will be asked to complete a detailed questionnaire designed by an independent organization engaged by the Patent and Trademark Office (PTO) to solicit your views on the Automated Patent System (APS). The project is being initiated by Commissioner Lehman and is part of our commitment to provide the best tools and support you need to do your job.

The senior management of PTO believes that you -- the primary users of APS -- have much to tell us about how APS is currently working and what kinds of things need to be changed in order to facilitate the way you approach your work. We are eager to hear feedback directly from the examining corps and I encourage every examiner to take the time to complete the questionnaire.

All of you will receive a copy of the questionnaire. Some of you will be randomly chosen to complete the questionnaire in a group setting in the Patent Academy on October 27. As part of our continuous quality improvement effort, we will also ask those individuals to complete a survey on their views of the P4000 computers. The rest of you will receive the APS questionnaire in a sealed envelope mailed to your home. In either case, you will not be asked to reveal any identifying information and your responses will be totally anonymous. Those receiving the questionnaire in the mail will be provided with an envelope for returning the completed questionnaire directly to the outside organization we have engaged for this study.

Results derived from the questionnaire will be published in a report in December 1994 and copies made available to you. What we learn from your participation will guide us as we plan together for the future.

Thank you for your full cooperation in this important project.

Sincerely,

Lawrence J. Goffney, Jr.
Assistant Commissioner for Patents



UNITED STATES DEPARTMENT OF COMMERCE

Patent and Trademark Office

ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

October 18, 1994

TO: GROUP DIRECTORS

FROM: Office of Assistant Commissioner for Patents

SUBJECT: APS Survey

As I indicated in my memo of October 13th, I consider the APS survey an important opportunity for examiners to voice their opinions on the APS and the future of automation in the Patent and Trademark Office. I encourage all those who will be surveyed to participate.

Attached is a listing of examiners in your Group who have been randomly selected to participate in the APS Survey on Thursday October 27, 1994 at 2 PM in the Patent Academy (PK1, Suite 501). Also, attached is a memo for distribution to each examiner on the list.

I ask that you deliver this memorandum to each listed examiner in your Group and confirm that they can attend. Once you have confirmation on who will attend, please fax that list to Greg Mullen from the Center for Quality Services at 305-8002. He needs your list by Monday October 24th, 1994.

Greg's fax number is 305-8002 and his phone number is 305-4217, if you have any questions.

**Larry J. Goffney, Jr.
Assistant Commissioner for Patents**

Attachments

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UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER OF
PATENTS AND TRADEMARKS
Washington, D.C. 20231

October 18, 1994

Dear Patent Examiner:

You have been randomly selected to participate in the APS Survey Session to be held on October 27th, 1994. As I stated in my letter to you on October 13th, I consider your opinion important in planning for the future of automation in the Patent and Trademark Office. I encourage you to take advantage of this opportunity to let your views be known.

Please advise your SPE/Group Director on whether or not you will be available to participate in the survey.

If you are available to participate, you are requested to report to the Patent Academy (PK1, Suite 501) on Thursday, October 27, 1994, at 10 AM, to take the survey.

Lawrence J. Goffney, Jr.
Assistant Commissioner for Patents

Appendix G

Annotated Bibliography

Business Reengineering Team. *Patents As-Is Activity Model: Reader Kit.* U.S. Patent and Trademark Office, U.S. Department of Commerce, April 11, 1994.

A working document prepared by PTO's Business Reengineering Team, the *Patents As-Is Activity Model: Reader Kit* describes in narrative and work-flow form all activities associated with the patent application process. This particular version of the document, the "recommended version," was distributed to select internal readers for comment.

Cohen, Senator William S. *Computer Chaos: Billions Wasted Buying Federal Computer Systems.* Subcommittee on Oversight of Government Management, Senate Governmental Affairs Committee, October 12, 1994. (32 pages)

A comprehensive report on the federal government's practices for purchasing computers, *Computer Chaos* outlines the major problems associated with the federal government's computer acquisition strategies, and makes several recommendations on how these practices should be changed. The report emphasizes the need for earlier and more effective oversight of computer acquisition programs.

Lucas, Jay, Mathews, Alan, Purcell, Arthur, Stouffer, Richard and Swann, Judy. *Analysis of Advantages of APS.* Office of Planning, Development and Evaluation, Search and Information Resources Administration, Patent & Trademark Office, March 31, 1994. (29 pages)

Based on comments by working examiners and classifiers, as well as observations by Search and Information Resources professionals who have been engaged in the development of many of APS's features, this report outlines some advantages of using APS's Classified Search-Image Retrieval and Text Search subsystems over the paper-based shoes. The report is an update of a paper written in January, 1993 and is divided into the following sections: Quality Advantages, Patent Application and Patent Processing Advantages, Time Saving Advantages, Public Service and U.S. Competitiveness Advantages, International Agreement Advantages, and other advantages of APS over the paper shoes.

U.S. Patent and Trademark Office. *Strategic Information Technology Plan: FY1995-FY2000*. U.S. Department of Commerce, June 24, 1994 and October 24, 1994 Drafts.

These draft documents outline the five major automated information systems which make up the Automated Patent System and describes the development, replacement and enhancement projects that are planned for the period FY1995 to FY2000.

U.S. Government Accounting Office, Report to Congressional Requestors. *Patent and Trademark Office: Key Processes for Managing Automated Patent System Development Are Weak*. September, 1993.

In response to a request by The Honorable Dennis DeConcini, Chairman of the Subcommittee on Patents, Copyrights and Trademarks, Committee on the Judiciary, U.S. Senate, and The Honorable William J. Hughes, Chairman of the Subcommittee on Intellectual Property and Judicial Administration, Committee on the Judiciary, U.S. House of Representatives, the GAO prepared this report on the PTO's ability to establish benefit, cost and schedule baselines for the Automated Patent System. The report concludes that PTO does not have the appropriate processes in place to manage APS in a sound and efficient manner, and makes four major recommendations for determining whether or not PTO's current objectives for APS development are relevant to what the office needs in terms of an automated information system.



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